PHYSICAL CONSTANTS OF HYDROCARBONS

Volume II

CYCLANES, CYCLENES, CYCLYNES, and OTHER ALICYCLIC HYDROCARBONS

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Dedicated to

JOSEPH G. ALTHER

GENERAL INTRODUCTION

American Chemical Society Series of Scientific and Technologic Monographs

By arrangement with the Interallied Conference of Pure and Applied Chemistry, which met in London and Brussels in July, 1919, the American Chemical Society was to undertake the production and publication of Scientific and Technologic monographs on chemical subjects. At the same time it was agreed that the National Research Council, in coöperation with the American Chemical Society and American Physical Society, should undertake the production and publication of Critical Tables of Chemical and Physical Constants. The American Chemical Society and the National Research Council mutually agreed to care for these two fields of chemical development. The American Chemical Society named as Trustees, to make the necessary arrangements for the publication of the monographs, Charles L. Parsons, secretary of the society, Washington, D. C.; the late John E. Teeple, then treasurer of the society, New York; and Professor Gellert Alleman of Swarthmore College. The Trustees arranged for the publication of the A. C. S. series of (a) Scientific and (b) Technologic Monographs by the Chemical Catalog Company, Inc. (Reinhold Publishing Corporation, successors) of New York.

The Council, acting through the Committee on National Policy of the American Chemical Society, appointed editors (the present list of whom appears at the close of this introduction) to have charge of securing authors, and of considering critically the manuscripts submitted. The editors endeavor to select topics of current interest and authors recognized as authorities in their respective fields.

The development of knowledge in all branches of science, especially in chemistry, has been so rapid during the last fifty years, and the fields covered by this development so varied that it is difficult for any individual to keep in touch with progress in branches of science outside his own specialty. In spite of the facilities for the examination of the literature given by Chemical Abstracts and by such compendia as Beilstein's Handbuch der Organischen Chemie, Richter's Lexikon, Ostwald's Lehrbuch der Allgemeinen Chemie, Abegg's and Gmelin-Kraut's Handbuch der Anorganischen Chemie, Moissan's Traité de Chimie Minérale Générale, Friend's and Mellor's Textbooks of Inorganic Chemistry and Heilbron's Dictionary of Organic Compounds, it often takes a great deal of time to coördinate

the knowledge on a given topic. Consequently when men who have spent years in the study of important subjects are willing to coördinate their knowledge and present it in concise, readable form, they perform a service of the highest value. It was with a clear recognition of the usefulness of such work that the American Chemical Society undertook to sponsor the publication of the two series of monographs.

Two distinct purposes are served by these monographs: the first, whose fulfillment probably renders to chemists in general the most important service, is to present the knowledge available upon the chosen topic in a form intelligible to those whose activities may be along a wholly different line. Many chemists fail to realize how closely their investigations may be connected with other work which on the surface appears far afield from their own. These monographs enable such men to form closer contact with work in other lines of research. The second purpose is to promote research in the branch of science covered by the monograph, by furnishing a well-digested survey of the progress already made, and by pointing out directions in which investigation needs to be extended. To facilitate the attainment of this purpose, extended references to the literature enable anyone interested to follow up the subject in more detail. If the literature is so voluminous that a complete bibliography is impracticable, a critical selection is made of those papers which are most important.

Preface

The alicyclic hydrocarbons are available in nature to an enormous extent. Petroleum is the greatest potential source of the cyclanes or cycloparaffins (naphthenes). The oil production of the world for 1939 was about 2,000,000,000 barrels, of which 500,000,000 were cyclane hydrocarbons. This volume of cyclanes was largely consumed as motor fuel, kerosene, gas oil, Diesel oil, lubricants, and as fuel for household and industrial use.

A new chemical industry could well be developed based upon cyclane chemistry, to which very little research has been directed. At the moment a new chemical industry is being founded in the aliphatic hydrocarbons derivable from petroleum and natural gas. The chemistry of the cyclenes through essential oils and their polymerization has been studied through the years.

The collation of the physical constants, melting point, boiling point, specific gravity, and refractive index of the alicyclic hydrocarbons has been made in order to facilitate and energize research for chemical derivatives of scientific and utilitarian use in this potentially fruitful field.

The author deeply appreciates the assistance of his colleagues, Dr. J. Sherman, Prudence M. Van Arsdell, Dr. R. B. Dull, Dorothy V. Nordman, Dorothy Sigman, and Mary Alexander in this collation and critical study of the physical constants of the alicyclic hydrocarbons.

GUSTAV EGLOFF

February 15, 1940

Physical Constants of Hydrocarbons

Cyclanes, Cyclenes, Cyclynes, and Other Alicyclic Hydrocarbons

TABLE OF CONTENTS

Volume II

I. Introduction

1. *Foreword*

The present volume is the second of a four-volume work on the collation and systematic study of the physical constants of all classes of pure hydrocarbons. Volume I, which was published in March 1939, includes the paraffins, olefins, acetylenes, and other aliphatic compounds. The physical constants of the cyclanes or cycloparaffins, cyclenes or cycloölefins, and other alicyclic compounds are reported in Volume II. All cyclic hydrocarbons containing nonaromatic rings have been critically evaluated in this study. The literature and our own and other experimenters' work have been reviewed in order to present all the data which has been available to March 1939.

In comparing the alicyclic hydrocarbons with those of the aliphatic series, it may be pointed out that the former group has not been as extensively studied as the latter as regards physical constants. This is due, in part, to the fact that the aliphatic hydrocarbons have been of more scientific and industrial importance for a longer time than the alicyclic compounds.

The data on the four physical constants melting point, boiling point, specific gravity, and index of refraction of the liquid hydrocarbons are more inconsistent for the alicyclic than for the aliphatic hydrocarbons. The greater difficulty of preparing pure alicyclics probably accounts for this, and also the constants reported in many cases are for mixtures of geometrical isomers rather than individual compounds. A further difficulty in obtaining precise physical constant values for a number of alicyclic hydrocarbons is that they may partially isomerize while the determination is being made due to catalytic influences of the apparatus.

The greater inaccuracy of the alicyclic constants is evidenced by the adopted values of the constants, which are given to fewer significant figures than is the case for the aliphatics. The specific gravity and index of refraction values are given to three significant figures in almost all cases as compared to four and five for the aliphatic compounds.

In contrast to the studies which have been made by various workers in correlating physical constants of aliphatic hydrocarbons, almost nothing of this character has been carried out for the alicyclic hydrocarbons.

2. *The Structure of Alicyclic Hydrocarbons*

A. Introduction

Although much experimental and theoretical work has been done in recent years in order to determine the structures of alicyclic hydrocarbons, the problem cannot be regarded as solved up to the present time (August 1939). The term structure is used here to denote the relative positions of the atomic nuclei in the molecule and not the electronic structure.

The fundamental postulate concerning the tetrahedral structure of a carbon atom stated by LeBel and van't Hoff in order to explain optical isomerism was also a method of presenting a valid picture of stereochemistry until the discovery of cyclic compounds in nature and in the laboratory. Due to this discovery, the idea of the rigid tetrahedral angle of 109° 28′ was necessarily modified. The six-membered ring of the alicyclic group was the first to be prepared and since the other members of the series, cyclopropane, cyclobutane, cyclopentane and others higher than cyclohexane were unknown in nature, and impossible to synthesize by laboratory methods in use before 1880[1], it was argued that they did not exist due to theoretical considerations then generally accepted.

A compound containing a cyclobutane ring and the discovery of cyclopropane between 1880 and 1885 led to the modification of the ideas concerning the existence and possible stability of the cyclic compounds, and in 1885 Baeyer[2] proposed the strain theory to explain the relative stabilities of cyclopropane, cyclobutane, cyclopentane, and cyclohexane. His theory, however, did not explain the existence of the higher ring compounds.

Since the time of Baeyer, the higher ring compounds have been synthesized and a theory for strainless ring structures[3] has been developed which will be discussed later.

B. General Considerations

One of the fundamental postulates of structural organic chemistry is that the angles between the carbon-carbon bonds in a saturated hydrocarbon molecule are tetrahedral. Many facts accumulated through the years support this postulate. Within recent years the tetrahedral nature of the carbon atom in a few simple cases has been directly verified by experiments determining the crystal structure of hydrocarbons by x-ray diffraction, by electron diffraction of gases, and by spectroscopic analysis. Evidence has also accumulated showing that the radius of the carbon atom in saturated compounds is nearly constant at 0.77 Å. (the bond distance between two atoms is equal to the sum of the atomic radii). If this were not so, then planar rings having tetrahedral angles could be constructed having more carbon atoms than cyclopentane. Bond angles in saturated ring compounds should be tetrahedral, just as in aliphatic hydrocarbons. For cyclopropane and cyclobutane and many other compounds containing fused rings such as carene or bicyclohexane this is geometrically impossible.

It is possible to construct a six-membered ring, cyclohexane, in which the carbon-carbon bond distances are equal, and the angles all tetrahedral; hence the ring will not be planar. This was clearly pointed out by Sachse[4] and later elaborated upon by Mohr[5] in order to show that rings containing more than five carbon atoms need not be strained as Baeyer believed. It remained for Cohen-Henriquez[6]

(1) Meyer, *Ann.*, **180**, 192, 1876
(2) Baeyer, *Ber.*, **18**, 2278, 1885
(3) Ruzicka, Stoll, Huyser, and Boekenoogen, *Helv. Chim. Acta*, **13**, 1152, 1930
(4) Sachse, *Ber.*, **23**, 1363, 1890
(5) Mohr, *J. prakt. Chem.* (2), **98**, 349, 1918
(6) Cohen-Henriquez, *Proc. Roy. Acad. Amsterdam* **37**, 532, 1934

to give a thorough mathematical treatment of the cyclohexane problem. He showed that it is possible to construct not only one but an infinite set of strainless cyclohexane rings. One of the members of this set, the so-called chair form of cyclohexane, is a singular one in that it cannot be derived from any of the others by a simple distortion not accompanied by a change in the bond angles. The other members of the set, of which the boat form is representative, can all be obtained from any one of them by twisting, not accompanied by bond angle change.

The point of chemical interest in this discussion is that if many forms of cyclohexane actually exist, then it should perhaps be possible to separate isomers corresponding to some of the different possibilities. What is even more pertinent to the present study is the wide variation in the physical constants of cyclohexane reported by investigators, which may in part be attributed to a partial or even complete separation of the boat and chair forms, and similarly for other alicyclic compounds. As a matter of fact, claims are made from time to time that such isomers have been separated. The most recent claim to the separation of the forms of methylcyclohexane is that reported by Vogel[7]. These results have been disputed by Wibaut, Langedijk, Smittenberg, and Hoog[8]; hence further studies should be made.

Although it is apparently impossible to separate the chair and boat forms of cyclohexane in the liquid state, the x-ray diffraction study of the structure of the crystals strongly indicate that the molecules are of the chair form.

In order to reconcile theory and experimental facts, it has been suggested that the possible forms of cyclohexane are in rapid equilibrium so that the statistical average corresponds to a plane structure. If it is assumed that cyclohexane oscillates between the chair and boat forms (the boat form is used here collectively to signify all the structures which may be derived from it by simple distortion), the low frequency of oscillation must be of negligible importance in increasing the stability relative to the individual forms. Also, it is by no means obvious that the activation energy in the conversion of the boat to the chair form is negligibly small.

The bond distances are more important in determining the structure than the bond angles, since it requires considerably more energy to change the normal carbon-carbon single bond distance a small amount than it does to change the bond angle.

Let us now consider the geometrical problem of determining how many forms of an equilateral, equiangular polygon of n sides may be constructed from a set of n points located at the vertices. The general case is extremely difficult and has not been treated. An equilateral, equiangular polygon of n sides may be constructed in which the sides are of any given length. However, the angles must have an average value equal to or less than $\left(\frac{n-2}{n}\right)\pi$. If the angles in the ring are each equal to the upper limit of $\left(\frac{n-2}{n}\right)\pi$, the ring is a planar one, and there is one and only one such ring which can be constructed. If, however, the angles are less than $\left(\frac{n-2}{n}\right)\pi$, the regular polygon will not be a plane. Moreover, as Cohen-

(7) Vogel, *J. Chem. Soc.*, **1938, 1323**

(8) Wibaut, Langedijk, Smittenberg, and Hoog, *Chem. and Ind.*, **57**, 753, 1938

Henriquez showed for cyclohexane, it will, in general, be possible to construct more than one such polygon for a given value of the angle.

Since two single bonds associated with a carbon atom which is part of a double bond tend to be at 120° angles to the double bond, and since the carbon-carbon double bond distance is about 14 per cent shorter than the carbon-carbon single bond distance, the introduction of one or more double bonds into a saturated ring will tend to change the ring configuration to some extent.

C. Monocyclic Rings of the Alicyclic Series

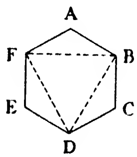
1. Cyclopropane, Cyclobutane, and Cyclopentane

The equilibrium positions of the carbon nuclei in each of these molecules are located at the vertices of an equilateral triangle, a square, and a regular pentagon respectively. The four carbon nuclei in cyclobutane are not geometrically required to lie in a plane. However, they probably are coplanar, for otherwise the average bond angle would be less than 90°, and the molecule would be less stable than the plane form.

In each of the cyclopropane, cyclobutane, and cyclopentane molecules, the two hydrogen bonds associated with each carbon are probably at the tetrahedral angle to each other, the plane of the bonds being perpendicular to the plane of the ring and bisecting the pertinent carbon bond angle.

2. Cyclohexane

Reference has already been made to the work of Cohen-Henriquez in which it was shown by methods of analytical geometry that there are an infinite number of possible cyclohexane rings in which the bond distances are all equal and the bond angles all tetrahedral. The configuration of any one possibility may be described by reference to the following figure:

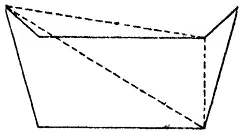


Since the bond distances and bond angles are to remain fixed, the large triangle *BDF* will remain invariant to all permissible forms of the cyclohexane ring.

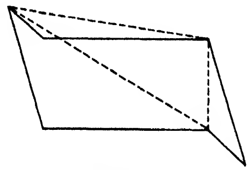
Let ϕ_1, ϕ_2, and ϕ_3 denote the angles which the small triangles *ABF*, *BDC*, and *DEF* make with the plane of the triangle *BDF* respectively. The configuration of the ring is completely specified when the values of the three angles ϕ_1, ϕ_2, and ϕ_3 are given. For the "fixed" or chair configuration

$$\phi_1 = \phi_2 = \phi_3 = \cos^{-1}(\sqrt{\tfrac{2}{3}}) = \pm 35° \text{ (approx.)}$$

The following figures depict the boat and chair forms respectively:



boat form

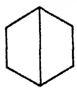


chair form

In each of these two forms there are four carbon atoms in a plane at the corners of a rectangle. In the boat form, the remaining two carbon atoms are both on the same side of the plane of the other four, and in the chair form, the two carbon atoms not in the plane of the other four are on opposite sides of this plane. For this reason, the boat form is sometimes referred to as the *cis* and the chair type as the *trans* form.

D. Cycloparaffins Containing Fused Rings

The carbon skeleton of the molecule [0,2,2]-bicyclohexane is usually written as



. Corresponding to this drawing, it may be described as the boat form of cyclohexane in which the 1,4-carbon atoms are bonded to each other. If the cyclohexane ring were undistorted, this bond would be $\frac{5}{3} = 1.67$ times as long as the bonds in the ring. (The 1,4- atoms in the chair form of cyclohexane are $\frac{1}{3}\sqrt{33} = 1.915$ times as far apart as the adjacent atoms in the ring, and a bond in this case would be even weaker than in the case being considered). Moreover, the two cyclobutane rings would be isosceles trapezoids in which two of the angles were tetrahedral and two of the angles 70° 32′. But from the structural principles already elaborated, it may be concluded that in [0,2,2]-bicyclohexane the 1,4- bond is not appreciably different from the other carbon-carbon bonds in the ring, and that the carbon skeleton consists of two cyclobutane rings (squares) the planes of which are inclined to each other at approximately the tetrahedral angle.

It is believed that [0,2,2]-bicyclohexane reacts rather readily to form derivatives of cyclohexane; and this is sometimes given as evidence that the 1,4- bond in the bicylohexane is much weaker than the other carbon bonds. This argument is unreliable for the following reasons: if one of the carbon-carbon bonds in the bicyclohexane is broken, *e.g.*, by the addition of hydrogen, the possible products are 1,2-dimethylcyclobutane, ethylcyclobutane, and cyclohexane. Cyclohexane is the most stable of these hydrocarbons; hence it is formed, assuming, of course, that the activation energy of this reaction is less than for the other reactions.

The foregoing discussion for [0,2,2]-bicyclohexane brings out certain general features of the structure of shared rings. This compound (as well as all other "bi" cyclocompounds) really contains three rings—two cyclobutane rings having a side in common, and a cyclohexane ring, three sides of which are common to one of the

cyclobutane rings and the other three sides to the other. The smaller rings are more important from energy considerations than the large one, *i.e.*, the cyclobutane rings tend to be squares at the expense of the regular cyclohexane ring. Similar considerations apply to other rings. For example [0,1,3]-bicyclohexane may be written as a cyclohexane with a bond between the 1,3-atoms; however, it is more nearly a regular pentagon and an equilateral triangle sharing a side, the plane of the triangle being inclined to the plane of the pentagon at the tetrahedral angle.

E. Alicyclic Hydrocarbons Containing Double and Triple Bonds

Cyclopropene has not been synthesized as yet. This is not surprising, for a consideration of the bond angles involved shows that cyclopropene would be highly unstable.

Cyclobutene is known, but not cyclobutadiene. The small increase in stability that would result from the resonance energy in the latter case is not sufficient to offset the instability due to 90° bond angles between conjugated bonds.

The introduction of one or two double bonds in the cyclohexane ring causes it to assume a configuration intermediate between benzene and cyclohexane.

In a very few cases rings containing triple bonds have been reported. These compounds would probably be unstable.

In the discussion of the structure of alicyclic ring hydrocarbons, it was assumed that the general structural features of these rings are determined by the carbon-carbon bond distances and the carbon-carbon bond angles. This is only an approximation. Other factors may be of significance—*e.g.*, the van der Waals' forces, the zero-point energy, and particularly the interaction of the carbon-hydrogen bonds with the carbon-carbon bonds in the ring[9]. Studies on the last factor are being made and will be reported in the fourth volume of this study of the physical constants of hydrocarbons.

F. Geometrical Isomerism

In the study of aliphatic hydrocarbons, it was pointed out that geometrical isomerism in the olefins occurs whenever a 180° rotation about the double bond of one of the two groups attached by the double bond would result in a molecular configuration which could not be converted to the original by any rotations of the molecule as a whole; *e.g.*, butene-2 has two geometrical isomers, the *cis*-butene-2 has the structure $\begin{matrix}H\\C\end{matrix}\!\!>\!C{=}C\!<\!\!\begin{matrix}H\\C\end{matrix}$, whereas the *trans*-butene-2 has the structure $\begin{matrix}H\\C\end{matrix}\!\!>\!C{=}C\!<\!\!\begin{matrix}C\\H\end{matrix}$. This group isomerism is due partly to the inability of rotation to take place about the double bond. In the alicyclic compounds geometrical isomerism also occurs for an additional reason—the lack of rotation about carbon-carbon single bonds which are part of a ring system. Geometrical isomerism in the alicyclic compounds is, consequently, a more prevalent phenomenon than in the aliphatic compounds.

(9) Cohen, Kistiakowsky, and Smith, *J. Am. Chem. Soc.*, 61, 1870, 1939; Govin, Walter, and Eyring, *ibid.* 61, 1876, 1939

Since geometrical isomers possess different physical properties their constants should be evaluated separately. In a few cases, the investigator has explicitly stated that his compound is *cis* or *trans*, and these have been listed as such in the tables. In the majority of cases where geometrical isomers are theoretically possible, the physical constants are reported without mention by the experimenter as to whether his compounds are the pure *cis* or pure *trans* isomer or some mixture of these. In accordance with the procedure of tabulating the constants adopted for the aliphatic olefins, the alicyclic constants are listed, but no effort was made to obtain an average value for possible mixtures of *cis* and *trans* isomers.

As has already been discussed in the section on structure, geometrical isomerism is a complicated phenomenon in the alicyclic compounds. Except for the simpler cases it is not usually possible to state definitely how many isomers are possible. Almost all the shared rings can exhibit geometrical isomerism, and therefore, the constants for these compounds have been evaluated in only a few cases.

The possibilities of geometrical isomerism become quite complex in shared ring systems. Cohen-Henriquez investigated the perhydronaphthalene ring and found that several fixed and mobile configurations are possible. Actually perhydronaphthalene has been separated into *cis* and *trans* isomers having different physical constants. In other shared ring systems, the physical constants are, with few exceptions, reported without mention of the possibility of geometrical isomerism.

3. *Nomenclature of Alicyclic Hydrocarbons*

A. Introduction

The nomenclature of alicyclic hydrocarbons is in a confused state due to the many terms and numbering systems used. In some cases the same experimenter has named and numbered the alicyclic hydrocarbons several ways in the same publication without explanation. The nomenclature rules for this series of hydrocarbons are not as extensive, and in some cases not so clearly defined as those used for the aliphatic compounds. An attempt has been made in the present study to bring about uniformity in the numbering and naming of the alicyclic hydrocarbons. The saturated cyclic compounds were originally called polymethylenes and the term still persists due to the chemical formulae being multiples of methylene. Each compound was named by means of the Greek numerical prefix plus methylene, hence cyclopentane was first known as pentamethylene. Several disadvantages of this naming system developed as work progressed in alicyclic chemistry. The term polymethylenes was too inflexible to be of value due to the fact that the term applied only to the single ring saturated structures.

Other terms applied to alicyclic hydrocarbons and widely used are naphthenes, hydroaromatics, and terpenes. The terpene classification has been omitted from separate consideration in this study, since it is recognized that the members of this group are classified in their proper alicyclic series. The terpene names have been retained in addition to the systematic ones assigned in the Geneva system. In so arranging the terpenes, it is hoped that structural relationships will be shown throughout the different series rather than for individual compounds in the usual terpene groupings. Although there are generic group names given to the naph-

thenes, polymethylenes, and hydroaromatics, they are not classified under these terminologies.

The disadvantages imposed by such names as polymethylenes, naphthenes, hydroaromatics, and terpenes are overcome by the more systematic terms which include cyclanes, cycloalkanes, or cycloparaffins; cyclenes, cycloalkenes, or cyclo-olefins; cyclynes, cycloalkynes, or cycloacetylenes. *Chemical Abstracts*[10] uses the terms cyclanes, cycloalkanes, cycloparaffins, and naphthenes to cover the cyclic hydrocarbons of the general formula C_nH_{2n}.

In this study of the physical constants of alicyclic hydrocarbons, the terms *cyclanes, cyclenes, and cyclynes* are used generically for the monocyclic compounds due to the simplicity of the terms compared to the others which have been used.

B. Geneva Nomenclature

1. Introduction

The rules used in this study were obtained in part from the Definitive Report of the Commission on the Reform of Nomenclature of Organic Chemistry and the Council of the International Union of Chemistry[11]. The data in Beilstein were also used where the Geneva rules were not sufficient. These two sources of nomenclature generalizations were found insufficient for the complete study and were supplemented by the author.

2. Rules and Author's Comments

a. Monocyclics

The following rules[11] are quoted from the Definitive Report:

"11. Saturated monocyclic hydrocarbons will take the names of the corresponding straight chain saturated hydrocarbons, preceded by the prefix '*cyclo.*' They will bear the generic term cycloalkanes."

Author's note. In this study the term cyclanes has been used instead of cycloalkanes.

"13. When they (alicyclics) are unsaturated Rules 8 and 9 will be applied. However, in the case of partially saturated polycyclic aromatic compounds, the prefix *hydro* preceded by *di-*, *tri-*, *tetra-*, etc., will be used. Example—Dihydroanthracene."

Author's note. The Geneva[11] Rules 8 and 9 have been adapted on the basis of Rule 13 so as to apply to the alicyclic hydrocarbons.

Rule 8. In the names of unsaturated cyclic hydrocarbons having one double bond, the ending *-ane* of the corresponding saturated hydrocarbon will be replaced by the ending *-ene;* if there are two double bonds, the ending will be *-diene*, etc. These hydrocarbons will bear the generic names *cyclenes, cyclodienes, cyclotrienes,* and *cyclotetraenes* except in aromatic structures.

Rule 9. The names of triple bond cyclic hydrocarbons will end in *-yne*. They will bear the generic names *cyclynes.*

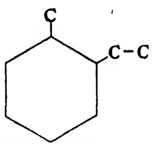
(10) *Chem. Abs.*, Index, 1938

(11) Patterson, *J. Am. Chem. Soc.*, 55, 3905, 1933

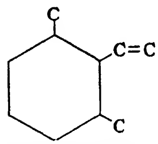
"*Rule 49a*[12]. Cyclic hydrocarbons with aliphatic side chains are to be named according to one of the two following methods: (*a*) The radical names denoting the side chains are prefixed to the name of the cyclic hydrocarbon. (*b*) The cyclic hydrocarbon residue, if it can be named as a radical, is considered a substituent of the aliphatic chain.[12]

"Naming according to (*a*) is in general preferable when the side chain is short or when several side chains are present. Naming according to (*b*) is more convenient when the side chain is long, and particularly when the cyclic hydrocarbon residue is not at the end of this chain."

Author's examples:



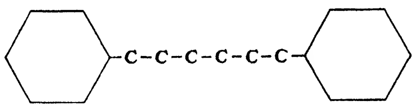
1-Methyl-2-ethylcyclohexane



1,3-Dimethyl-2-ethenylcyclohexane

"When several cyclic hydrocarbon residues are united by an aliphatic chain the name of the compound will be derived from that of the aliphatic hydrocarbon, provided radical names are available for the cyclic hydrocarbon residues."

Author's example:



1,6-Dicyclohexylhexane

The following rules for numbering and presentation of the various ring systems used throughout this study of alicyclic hydrocarbons are taken from the "Proposed International Rules for Numbering"[12].

The adaptations of the rules with explanations of the changes necessary in this study, together with present practices are given in *Chemical Abstracts* Index for 1938. Only those rules which may apply to the alicyclic hydrocarbons are reported here[13] despite the fact that the rules are not specific enough.

"A. The System Consists of a Single Ring

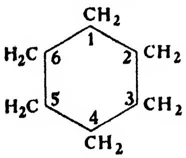
I. The ring is carbocyclic

Rule 1. "Number around the ring in such a manner as to give to hydrogen atoms the lowest numbers possible.

(12) Latest text adopted at Lucerne 1936, and confirmed in Rome, 1938, Science, 87, No. 2253 216, 1938

(13) Patterson, *J. Am. Chem. Soc.*, 47, 543, 1925, *Chem. Abs.*, Index, 1938

"*Examples:*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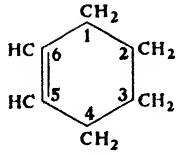
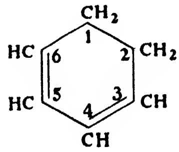
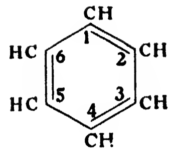

II

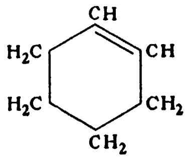




"Note 4. Fixed orientations are an aid to memory and should not be neglected. Single rings should be oriented with Position 1 at the top and with numbers proceeding clockwise around the ring."

Author's note: The latest *Chemical Abstracts* practice[10] regarding the bond placement in the ring reverses Rule 1 and gives the double bond the lowest number possible rather than the hydrogen previously shown.

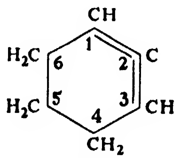
Example:

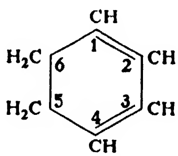


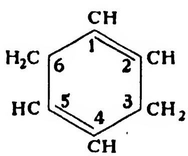
This is in line with the rule covering aliphatic hydrocarbons where the lowest number is given to the double or triple bond when they appear singly in the compound. It is more convenient in this study to follow this system for the ring compounds instead of Rule 1.

In the six membered cyclodiolefins there are three positions possible for the bonds, the 1,2; 1,3 and 1,4; the substituting groups are oriented with higher or lower numbers in respect to the double bonds.

Examples:


III*a*


III*b*


III*c*

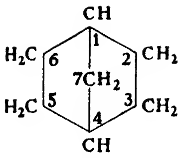
A cyclodiolefin of 1,2 structure as shown has been reported and the constants shown in the tables, although there is doubt as to the existence of such a compound.

Examples III*a*, III*b*, and III*c* are used throughout our study and supplant Examples II and III of Rule 1 made in 1925.

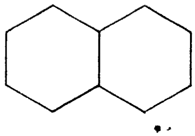
b. Polycyclics

"B. The System Contains at Least Two Rings of Five or More Members, but no Atomic Bridges, Crossed Valence Bridges or Free Spiro Unions

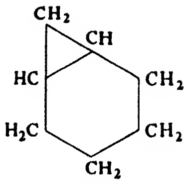
"Note 6. An 'atomic bridge' is one that contains atoms (*e.g.*, the bridge in norcamphane, V) as contrasted with a 'valence bridge' (*e.g.*, that in naphthalene, VI, or in norcarane, VII).



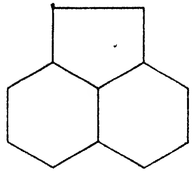
V



VI

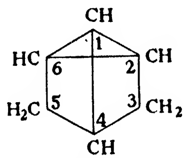


VII



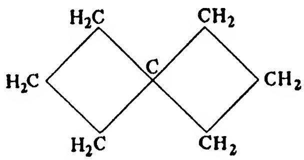
VIII

"Note 7. 'Crossed valence bridges' are valence bridges that are represented by the plane formula as crossing each other as shown in Example XLVIII.



XLVIII

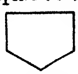
"Note 8. A 'spiro union' is one formed by a single atom which is the only common member of two rings. A 'free spiro union' is one constituting the *only* union direct or indirect, between two rings as in IX. Systems in which the rings are united in some other way (that is by intermediate rings) as well as by the spiro union are not necessarily excluded from Class B.

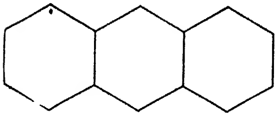


IX

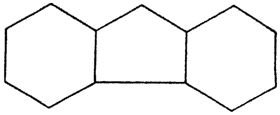
"Note 9. In determining whether or not a system contains at least two rings of five or more members, one counts as component rings *only the smallest number of smallest rings that together will account for all the atoms and valences.*

"*Rule 6.* Orient the formula so that the greatest possible number of rings will be in a horizontal row.

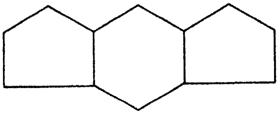
"Note 10. Triangles in such a row should have one side vertical, other rings two sides vertical (this requires a deformation of the polygons with an odd number of sides, thus:  or ). Accordingly, hexagons should have angles, not sides, at top and bottom. Anthracene (XIII) constitutes a horizontal row of three, so do fluorene (XIV) and s-indacene (XV), but phenanthrene (XVI) does not."



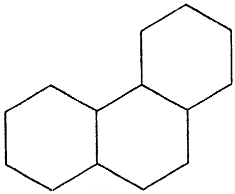
XIII



XIV



XV

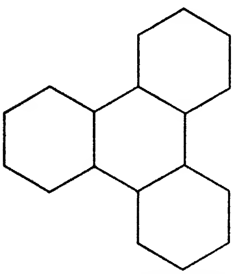


XVI

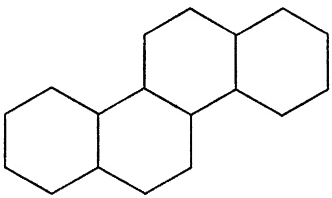
Author's note: The use of regular polygons such as a regular pentagon for cyclopentane, etc., have been used in the tabulated data since it is thought that these structural configurations more nearly represent the equilibrium position of the atoms in the molecule.

"*Rule 7.* Of orientations conforming to Rule 6, choose the one that places as many as possible of the remaining rings above and to the right.

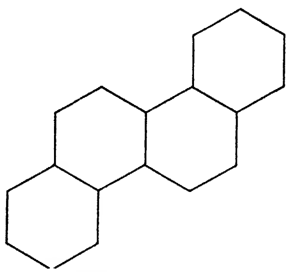
"Note 11. Only the *number* of rings and not their size or distance from the center, is taken into account. When the correct orientation is not immediately apparent, bisect the 'horizontal row' by a horizontal axis and a vertical axis (as in XXI) and count the rings and fractions of rings in the four quadrants. If there is more than one combination of rings that could serve as the 'horizontal row,' apply the bisection in the other cases also (as in XXII). Choose the orientation that has as many as possible of the 'remaining rings' in the upper right quadrant; if two or more orientations meet this requirement, choose the one of them that has as few rings as possible in the lower left quadrant. In the examples, phenanthrene (XVI) is shown correctly oriented with its single 'remaining ring' turned upward toward the right; triphenylene (XVII) has one in the upper right quadrant and one in the lower right; Examples XVIII–XX show right and wrong orientations of chrysene; and XXI and XXII show right and wrong orientations in a case that might not be immediately apparent.



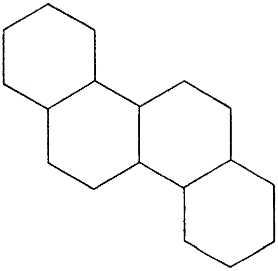
XVII Triphenylene



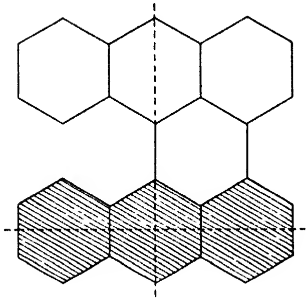
XVIII (right) Chrysene



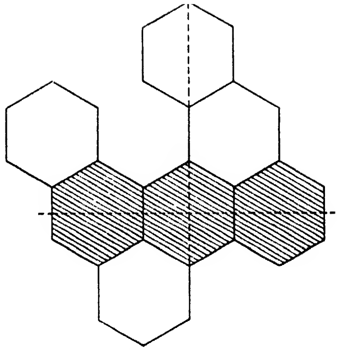
XIX (wrong)



XX (wrong)



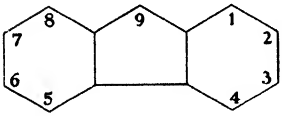
XXI (right)



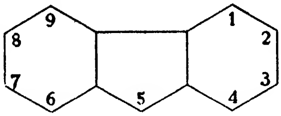
XXII (wrong)

"*Rule 10.* Of orientations conforming to Rules 6–9, choose the one in which unnumbered carbon atoms follow the lowest numbers possible.

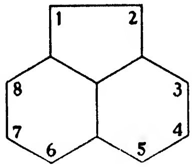
"*Examples:* In XXIX the unnumbered carbon atoms follow the numbers 4,4,8,9; these are lower than the 4,5,9,9 of XXX. Similarly, the numbers 2,5,8 of XXXI are lower than the 3,5,8 of XXXII.



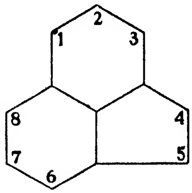
XXIX (right)



XXX (wrong)



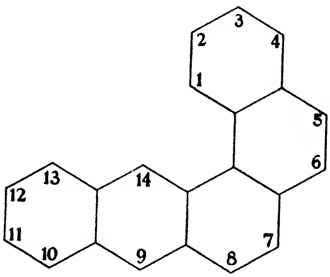
XXXI (right)



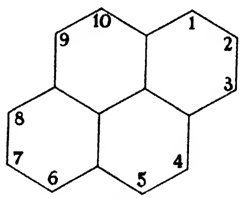
XXXII (wrong)

"*Rule 11.* Of orientations conforming to Rules 6–10, choose the one that gives to hydrogen atoms the lowest numbers possible.

"*Rule 12.* Number the oriented formula by beginning with the first free angle of the upper right ring and proceeding clockwise around the entire formula to the beginning, numbering all carbon atoms that are not common to two or more rings.



XXXIII



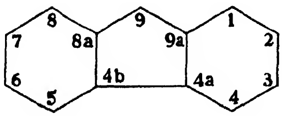
XXXIV

"Note 12. The 'first free angle' is the first angle, not also part of another ring, from which one may proceed clockwise around the ring.

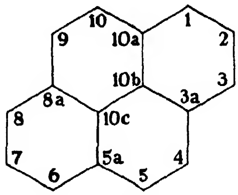
"Note 13. The 'upper right ring' is the highest ring in the formula or, if two or more are equally high, then the ring farthest to the right in the highest row.

"Note 14. Ordinarily, no numbers are needed for carbon atoms that are common to two or more rings. When such a need does arise, it is recommended that they be numbered by adding *a* (or *b*, *c*, etc., in case of a succession of them) to the number of the position just preceding in the clockwise order; interior carbon atoms are considered to follow the highest number."

Examples:

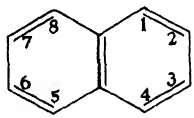


XXXV

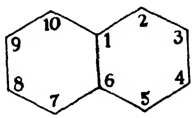


XXXVI

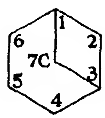
Author's note: In numbering the alicyclic series, the system is not changed entirely but is slightly different for saturated fused ring systems than that generally accepted for aromatic hydrocarbons. For example: Naphthalene is numbered thus:



while the decahydronaphthalene, [0,4,4]-bicyclodecane is numbered thus:



This method is in line with that in general usage for the fused rings of the following type:

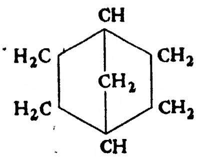


"C. The System Does Not Belong to Classes A and B, and Does Not Contain Free Spiro Unions

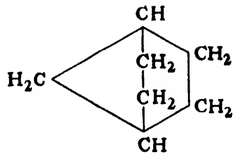
"I. The system consists of two rings only, separated by either an atomic bridge or a valence bridge.

"Note 16. Formulas of systems belonging to Class C, I must be drawn so that the bridge contains as few members as possible.

Examples:



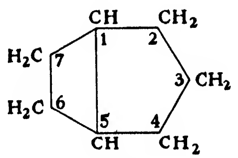
XXXVII (right)



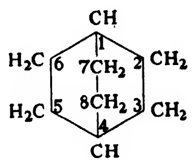
XXXVIII (wrong)

"Rule 13. Starting with one end of the bridge as 1, number around the longe way to the other end of the bridge, then on around the shorter way to the beginnin and finally, by the shortest path, along the bridge itself if the bridge is atomic. I there are two or more possibilities for the shortest path, choose the shortest pat from the highest previous number that will give a decision. Number all rin members.

Examples:



XXXIX

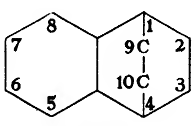


XL

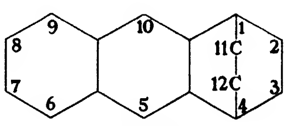
"II. The system contains one or more atomic bridges the removal of whic would throw the system into Class B.

"Rule 17. Disregarding the atomic bridges and converting the resulting form to the lowest stage of hydrogenation, number by Rules 6, 7, 10, 11 and 12; the number the bridge members, following the shortest path as in Rule 13.

Examples:



XLIII



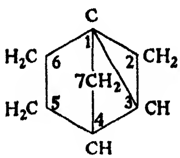
XLIV

"Note 17. The atomic bridges in Class C, II must contain as few members a possible.

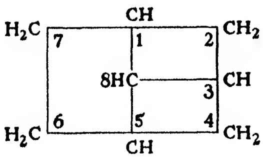
"III. The system does not belong under I or II.

"Note 18. The systems of Class C, III contain two or more bridges, eithe atomic or valence. Special care must be taken to draw the formula so that th bridges shall be as simple and of as few members as possible. A branched bridg is regarded as consisting of a main bridge and one or more branch bridges. A branched bridge should be preferred to crossed bridges even though it contain more members (see XLVII and XLVIII), but in no case should the chain o

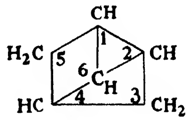
bridge members between the two bridge ends be greater than either of the outside chains between the same points. In difficult cases it may be advisable to construct a spatial model so as to decide upon the most natural plane formula.



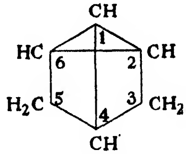
XLV



XLVI



XLVII



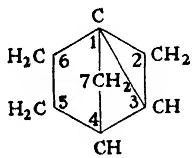
XLVIII

"Rule 18. Select as the chief bridge (one end of which becomes Position I) the one having the most members or, if two have an equally large number of members, the one that divides the outside ring more symmetrically; number as in Rule 13; then number any remaining bridge members by the shortest path.

Examples: See XLV, XLVI, XLVII.

"Rule 19. Of two or more numberings conforming to Rule 18, choose the one that gives the lowest numbers to the ends of the other bridges.

Example:



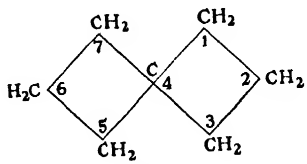
XLV

"D. The System Contains One or More Free Spiro Unions

I. The system contains spiro unions only.

"Rule 21. Beginning with a ring member next to the spiro atom in the right end ring, number clockwise around the end ring and on around the entire formula. Number all ring members.

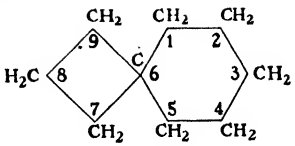
Example:



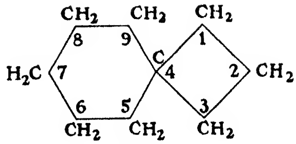
XLIX

"Rule 22. Of two or more numberings conforming to Rule 21, choose the one that gives the lowest numbers to spiro atoms."

Examples:

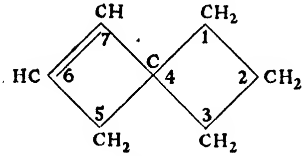


Wrong

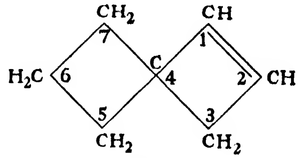


Right

Author's note: The placing of the double bond has been changed to the one position in this study rather than the six position as is shown in the following. See Chemical Abstracts:



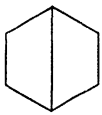
Wrong



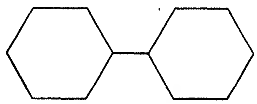
Right

C. Definition of Bi and Di in Alicyclic Nomenclature

In the nomenclature herein adopted for the alicyclic hydrocarbons it has been necessary to differentiate the fused (shared) or "endocyclic" from the "exocyclic" ring structures. The distinction between these two systems has been accomplished by *arbitrarily* using the prefix *bi* for hydrocarbons of fused rings or endocyclic type, and the prefix *di* for the separated rings or exocyclic type—as illustrated in the examples:

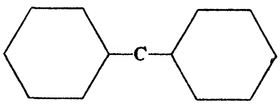


[0,2,2]-Bicyclohexane

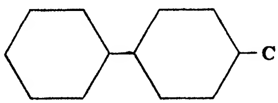


Dicyclohexyl

The prefix *di* is also used to denote two separate rings joined to the same carbon atom as illustrated in dicyclohexylmethane

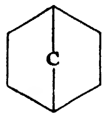


and *di* is also used as in dicyclohexylylmethane



In the present study the latter two cases are distinguished by the suffix *-yl* in the case in which the two rings are joined to each other directly.

In order to name the bicyclic compounds a unique system of numbering in relation to the rest of the compounds had to be adopted. For such compounds as the following



there was no method in existence which properly accounted for the fused ring state of the molecule. The system in use at present was proposed by Baeyer and the following conventions adopted: in the preceding formula the method of naming is as follows [1,2,2]-bicycloheptane. The first number considered is the number of carbons on the bridge, the next two numbers denote the number of carbons on either side of the bridge; the first (according to our own method) denotes the number of carbons to the right of the bridge and the second, the number to the left.

The foregoing usage of the prefixes bi and di will be followed consistently in this study.

D. Supplementary Nomenclature Considerations

The foregoing Geneva nomenclature rules are not sufficiently extensive to cover some complex polycyclic compounds and therefore will be supplemented by nomenclature taken from Beilstein[14] based upon the work of Baeyer, Stelzner, and Kuh.

The generalizations relating to the 2 and 3 ring, fused and condensed ring systems are given:

"1. Polycyclic hydrocarbons with an indirect linkage of single rings.

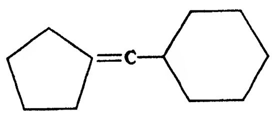
"The systematic naming of these hydrocarbons and derivatives is more easily accomplished if the following combinations are named with reference to the straight-chain hydrocarbons present in the compound.

Examples:

$C_6H_{11}\,.\,CH_2\,.\,C_6H_{11}$ Dicyclohexylmethane

$C_6H_{11}\,.\,\underset{\displaystyle C_6H_{11}}{\underset{|}{CH}}\,.\,C_6H_{11}$ Tricyclohexylmethane

$C_6H_{11}\,.\,CH_2\,.\,CH_2\,.\,C_6H_{11}$ 1,2-Dicyclohexylethane

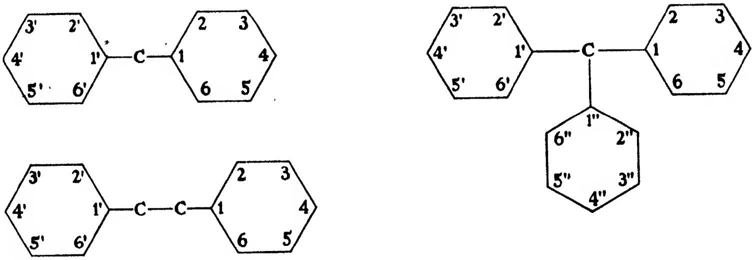


Cyclopentylidenecyclohexylmethane

"Proceeding with the aforementioned names to designate the homologues, substitution products, etc., the following numbering system is proposed.

(14) Beilstein, Vol. V, pp. 8–14, 1922

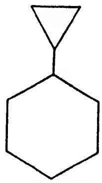
Examples:



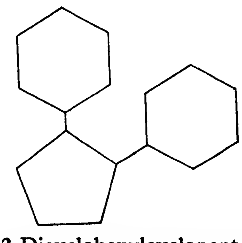
"2. Polycyclic hydrocarbons with directly connected ring structures. A general designation of this type of compound might be 'diphenyloid' since the original structure of this type was diphenyl.

"A method adopted for the naming of individual representatives of the double ring system is the use of one hydrocarbon ring as a stem and the other as the substituent.

Examples:

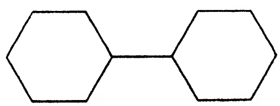


Cyclopropylcyclohexane



1,2-Dicyclohexylcyclopentane

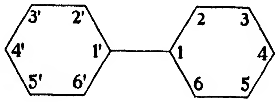
"The following rule is applied for both aromatic and alicyclic structures. The handling of the double nuclear symmetrical ring system allows two methods of naming, either as a double radical or according to the method previously shown. The literature contains both dicyclohexyl and bicyclohexyl for the following formula:"



Dicyclohexyl, bicyclohexyl, or cyclohexyl-cyclohexane

Author's note: **In our study of formulae of this type, the term dicyclic has been used to differentiate these hydrocarbons from those with internal rings.**

Beilstein states that: "The numbering is shown as follows:



The nomenclature of diphenyl and its homologues and unsymmetrical derivatives is based on diphenyl, as for example, 4,4'-dimethyldiphenyl, or as another example of nomenclature for the same compound, *p,p'*-ditolyl.

"For naming a univalent and a bivalent radical the diphenyl radicals are shown as follows:

$C_6H_5 . C_6H_4$—Diphenylyl or xenyl
—$C_6H_4 . C_6H_4$—Diphenylene

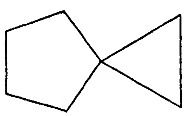
"Where the formulae are employed without the positions being designated, the diphenylyl radical is understood with the one free valence at the 4 position or para to the connecting bond. The diphenylene structure has the valence at the 2 and 2' or the ortho positions.

C. Polycyclic Hydrocarbons with Internal Rings

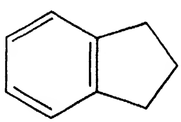
"Polynuclear ring systems that are of known structure contain fixed structures within the single ring. These are considered as condensed rings. The polynuclear ring systems characterized by having more than one ring in their fixed ring structure are considered as two rings fused together.

"One considers as condensed rings, polynuclear ring systems which are characterized by having more than one ring in their fixed ring structure. The single rings are, to a certain degree, fused together. Ring condensation of two single-rings present the following possibilities:

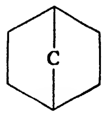
1. One carbon atom is common to both rings. The spiro configuration is the case where one carbon is shared by both rings.



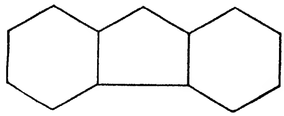
2. Two adjacent carbons are common to both rings.



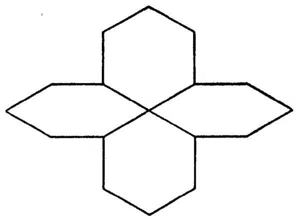
3. There are more than two carbon atoms common to both rings.



"Condensed ring systems which can be split into more than two single rings, can come about if the above manner of condensation is repeated so that no one ring member is common to more than two single rings.

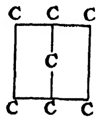


4. Certain carbon atoms are common to more than two single rings.

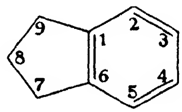


"For the derivation of systematic names in these different classes of condensed systems there are no fundamental rules carried over into general use which are extensively applicable. The attempts which have been made in this direction and which have yielded good results for certain parts show that the problem is most difficult and that there is small chance of reaching a solution which combines clarity of nomenclature with satisfactory simplicity. Thus is justified the historic procedure which has been developed and by which each polynuclear system whose significance extends through a number of known derivatives, is covered with a characteristic name. Nevertheless the necessity for the systematic or 'half systematic' nomenclature of the few polynuclear rings worked on remains persistent. This was shown especially in the years during which the literature search for this handbook (Beilstein) was carried on and in the different attempts at completion of preliminary principles and their extension. In a comprehensive way (1922) during a similar consideration of isocyclic and heterocyclic compounds, Stelzner and Kuh in the introduction to Vol. III of 'Literatur-Register der Organischen Chemie' attained the object for the basis of this book (Beilstein). Since this work is closely correlated with our book, the naming of compounds obtained according to the suggestion of Stelzner and Kuh, were, in suitable cases, used beside that in the original literature or according to established custom and are quoted with structural names. The following explanations are limited essentially to the prevailing practice of 1910.

"A proposal of Baeyer frequently followed in the literature can be applied to the bicyclic systems of cases 2 and 3. It suggests that one unite in the name, the total number of carbon atoms in the ring with the prefix bicyclo; this specifies by means of figures how many carbon atoms on each of the bridges lie between the two tertiary carbon atoms found at the place of ring branching. Thus one arrives at the name bicyclo-[1,2,2]-heptane for the hydrocarbon shown in the formula.

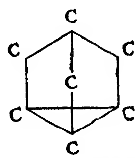


The numbering begins at a tertiary carbon turning the ring branching first in the wider then in the narrower orbit and going over finally to the carbon atom of the shortest bridge. Accordingly, the unsaturated hydrocarbon of formula



may be designated as bicyclo-[0,4,3]-nonatriene-1(6),2,4."

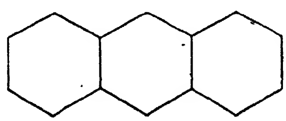
Up to the present time (August 1939) there has been no systematic method entirely satisfactory for naming the tricyclic groupings both of endo and exocyclic types of hydrocarbons. However, it is possible to apply in a limited way, the methods from bicyclic nomenclature to the naming of the triendocyclic compounds, as for example:



1,4-Endomethylene-[0,1,3]^{3,5}-bicyclohexane

The common name for such a configuration is apocyclene or tricyclene, which is, as usual, unconnected with the structure. The superscripts shown in the formula for bicyclo compounds, as (0,4,4)^{1,6} both in the unquoted part of the introduction and in the section on bicyclanes and bicyclenes are used to denote the positions at which the fusion of the inner bond is located.

The other tricyclic groupings have been difficult to designate in a systematic manner and therefore have retained their common name, for example:



Perhydroanthracene, or as a Geneva system name: 2,3-Cyclohexano-[0,4,4]-^{1,6} bicyclodecane.

The method of naming exocyclic tricyclo compounds is to use the prefix tricyclo with the suffix denoting the number of carbon atoms in the individual ring. This leaves no method for differentiating the endotricyclic compounds by use of a different prefix meaning three as in the relation of bi and di as adopted in this study.

For compounds of higher ring structure, the application of the Geneva system would be too cumbersome and tend toward ambiguity, although the hydrocarbons can be named as shown in the preceding examples.

The common names of the hydrocarbons have been included with the systematic ones, and an index for all of the common names will appear in the fourth volume of this work.

4. *Critical Evaluation of the Data and Calculation of the Most Probable Values*

A. Introduction

The problem of critically evaluating the experimental data has been somewhat complicated by investigators who have not reported probable errors of their physical constants; nor have they given sufficient details of their experiments to enable one to evaluate their constants with the degree of accuracy comparable to Volume I on aliphatic hydrocarbons. Since there is no one method by which the probable errors can be calculated from the alicyclic constants, an estimate has been made of the probable degree of reliability by consideration of the mode of synthesis, purification, and measurements.

In general, the physical constants of members of the alicyclic series are less reliable than those of the aliphatic series. The specific gravities and indices of refraction of aliphatic hydrocarbons are, on the average, reliable to one or two parts in 10,000; in contrast, the alicyclic variations are from two to four parts in 1,000. A striking example of inconsistency in the data is found in the data for 1-methylcyclohexene-1. There are data attributed to this compound which agree more closely with the more reliable physical constants of 3- and 4-methylcyclohexene-1. The experimenters have probably overlooked the possibility of isomerization of the compound during identification and measurement of the constants. This type of error may occur frequently but cannot be detected in this study because of a scarcity of accurate data for the pure compounds.

A discussion of the methods used in evaluating the melting points, boiling points, specific gravities, and refraction indices are given as follows:

B. Melting Points

There are fewer data for the melting points of alicyclic hydrocarbons than for any of the other physical constants collected. Less than twenty per cent of the compounds have melting point data. A critical analysis of the data is impractical at this time because in most cases only one or two values are given for any one compound.

C. Boiling Points

For each hydrocarbon the boiling point data are listed in order of decreasing pressure. The pressure in millimeters corresponding to each boiling point is given

unless this pressure is 760 mm. in which case it is omitted. The value given in bold-face type for each hydrocarbon is a weighted average of the experimental values given at 760 mm.

There are more values for specific gravity of the alicyclic hydrocarbons than for either the melting point or boiling point values. The specific gravity may be determined more accurately than either the melting or the boiling point.

D. Specific Gravity

In determining the temperature coefficients of specific gravity, it is assumed that the variation of specific gravity with temperature may be expressed by the equation:

$$D_4^t = D_4^{t_0} + a(t - t_0) + b(t - t_0)^2, \tag{1}$$

in which D_4^t is the specific gravity of the substance at the temperature t, $D_4^{t_0}$ the specific gravity at some constant temperature to, and a and b are constants to be evaluated.

The constants $D_4^{t_0}$ (t_0 usually being 20°), a, and b were determined by the method of least squares. If the data are for the same temperature, the method of least squares is equivalent to taking the weighted average of these data.

The temperature coefficient of specific gravity, *i.e.*, the derivative of D_4^t with respect to t, obtained from equation (1) is

$$\frac{dD}{dt} = a + 2b(t - t_0) \tag{2}$$

$$= a\left[1 + \frac{2b}{a}(t - t_0)\right] \tag{3}$$

In all but a few cases equation (1) represents a degree of accuracy unjustified by the experimental data. Under these circumstances equation (1) degenerates into

$$D_4^t = D_4^{t_0} + a(t - t_0) \tag{4}$$

and equation (3) to

$$\frac{dD}{dt} = a \tag{5}$$

Equation (4) reproduces the data to within three or four units in the third decimal place or about one part in 200.

The adopted value of $D_4^{t_0}$ is given in the specific gravity column in bold-face type, the last figure of which is usually given in small type, *e.g.*, 0.0812$_2$. This signifies that the last figure is to be used only in calculating specific gravities at temperatures other than 20°. Equation (3) or (5) is given in the additional data column.

When values in the form $D_{t_1}^{t_2}$ are reported, t_1 being different from 4°, the values of $D_4^{t_2}$ are calculated by means of the formula

$$D_4^{t_2}\ (\text{hydrocarbon}) = D_{t_1}^{t_1}\ (\text{hydrocarbon}) \times D_4^{t_1}\ (\text{water}).$$

$D_{t_1}^{t_2}$ is numerically equal to the density at t_2 in c.g.s. units when t_1 refers to the density of water at 4°.

The specific gravity values for each compound are listed in order of decreasing temperature. When the specific gravity was determined at 20°, this temperature was not recorded since the heading is given as D_4^{20}. If the specific gravity is referred to water at a temperature other than 4°, this fact is indicated by $D_{t_1}^{t_2}$ following the specific gravity value (t_1 and t_2 being expressed numerically).

E. Index of Refraction

For each compound the indices of refraction are given for the H_α, H_β, H_γ, Na_D, He_r, He_y, and He_g lines wherever data permit. The subscripts r, y, and g on the He lines signify red, yellow, and green respectively. The temperature of the index of refraction measurement is indicated by a superscript on the symbol designating the line. Thus 1.42565, n_H^{20} signifies that the value of the index of refraction at 20° C. for the H line is 1.42565.

The wave lengths of the above-mentioned lines are given below.

Table I—Wave Lengths of the Principal Lines Used in Index of Refraction Measurements

Line	*Wave Length, Å*
He_r	6678
H_α	6563
Na_D	5893
He_y	5876
He_g	5016
H_β	4861
H_γ	4341

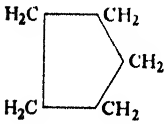
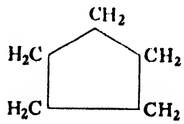
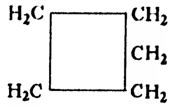
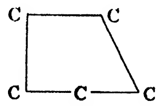
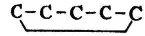
The temperature coefficients of the index of refraction are evaluated by the same method used for specific gravity. The changes with temperature are smaller but of the same order of magnitude as those of specific gravity. The value of $n_D^{t_0}$ ($t_0 = 20°$ whenever possible) is given in the index of refraction column in boldface type, and that of the temperature coefficient in the additional data column. The values of the indices of refraction are referred to the sodium *D* line unless otherwise indicated and are tabulated in a manner similar to those for specific gravity.

5. *Description of the Tables*

A. Structural Formulae

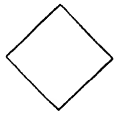
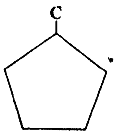
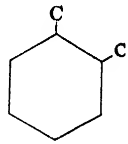
In writing the structure of the carbon skeleton of an alicyclic hydrocarbon, attempts are generally made to show only the number of carbon atoms in the ring. There is no intention to imply literal geometrical relation in the drawings. As a

result, a lack of uniformity occurs in writing the carbon skeletons of ring compounds. For example, cyclopentane is shown in a recent textbook of organic chemistry as follows:

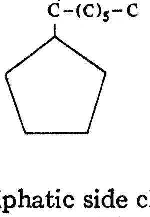
In the present work an attempt is made to depict the carbon rings so as to correspond as closely as possible to the configuration of the carbon nuclei as discussed in an earlier section.

For each hydrocarbon, only those carbon atoms not part of a ring are explicitly written, except for shared rings as noted later. The monocyclic rings from cyclopropane to cyclooctane inclusive are simply depicted as regular polygons. Thus, cyclobutane, methylcyclopentane, and 1,2-dimethylcyclohexane are written as follows:

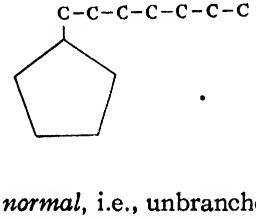




o-Xylene is often written in the same way as 1,2-dimethylcyclohexane above. However, this should result in no confusion to the reader inasmuch as compounds containing aromatic rings are not reported in the present volume. In volume III the aromatic rings will be distinguished from the alicyclics by the use of double bonds corresponding to any one of the Kekule-type structures.

Aliphatic side chains containing five or more carbon atoms in a straight chain will usually be written in an abbreviated manner. Thus, heptylcyclopentane will be written as



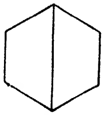
instead of



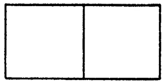
If the aliphatic side chains on the rings are *normal*, i.e., unbranched, the letter *n* has been omitted before the name. Thus butylcyclopentane will signify *n*-butyl cyclopentane.

As has been explained, the structures of many ring compounds, particularly those containing shared rings, are not known with certainty. As a consequence, the structural formulae have been reported more than one way in the literature

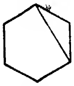
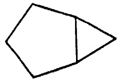
even when the attempt is made to show the geometrical configuration; *i.e.*, [0,2,2]-bicyclohexane is shown as either

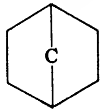


or

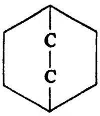


Although it is more frequently found in the literature in the former way, we shall write it in the latter way (*i.e.*, as two squares) because it has been shown in a previous section that this is somewhat nearer the actual configuration.

[0,1,3]-Bicyclohexane will be written in the form usually found in the literature, *i.e.*, as  even though it would be more correct to write it as . The latter is never given and might result in some confusion if it were adopted here.

In shared rings having three or more carbon atoms in common, all the shared carbon atoms except the terminal ones will be written explicitly. Thus, [1,2,2]-bicycloheptane and [2,2,2]-bicyclooöctane will be written as 

and as



respectively.

In polycyclic compounds containing more than two shared rings, the foregoing conventions are not strictly adhered to.

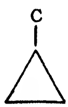
B. Introduction to Tables

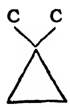
The tables contain the experimental data on melting point, boiling point, specific gravity, and index of refraction. The bold-face figures are weighted statistical averages of all the values collated to March, 1939.

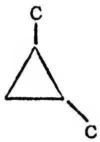
II. CYCLANES OR CYCLOPARAFFINS

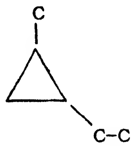
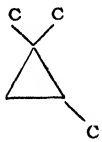
1. Cyclanes with alkyl substitutions C_nH_{2n}
2. Cyclanes with an alkenyl or olefin substitution C_nH_{2n-2}
3. Cyclanes with two alkenyl or olefin substitutions C_nH_{2n-4}
4. Cyclanes with an alkadienyl or diolefin substitution C_nH_{2n-4}
5. Cyclanes with an alkynyl or acetylene substitution C_nH_{2n-4}
6. Cyclanes with a cycloalkenyl or cycloölefin substitution C_nH_{2n-4}
7. Cyclanes with a bicyclenyl or bicycloölefin substitution C_nH_{2n-6}

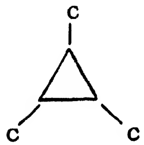
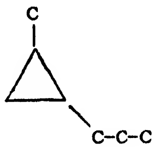
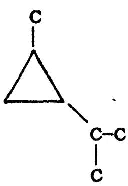
1. CYCLANES WITH AN ALKYL OR PARAFFIN SUBSTITUTION

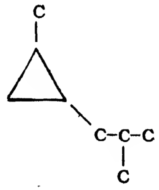
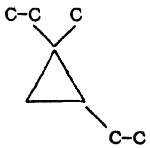
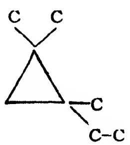
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclopropane	**−126.9**	**−33**	**0.688_9 @ −40°**	**1.377_1 @ −40°**	$\frac{dD}{dt} = -0.00116$/°C. (−80° to −35°)
	−127 [24] −126 [24a]	−32.6 to −33.6 [14] −32.89 [11] −32.9 [6] −32.89 [1] @ 755.9mm −34.5 [24] @ 750mm	0.6807 [8] @ −32.75° 0.6886 [8] @ −40° 0.720 [24] @ −79° 0.7352 [8] @ −80°	1.3726 [7] @ −32.75° 1.3769 [7] @ −40° 1.3799 [6] @ −42.5° 1.3790 [20] @ −42.8° 1.3898 [20] @ −60.0° 1.3971 [20] @ −71.2° 1.4024 [7] @ −80°	$\frac{dn}{dt} = -0.00064$/°C. (−80° to −35°)
C_4H_8 **Methylcyclopropane**					
	4 to 5 [5]		0.6760 [5] D_0^{-8} 0.6912 [5] D_0^{-20}		

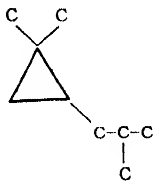
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Ethylcyclopropane		**34.5**	**0.677_6**	**1.379**	$\frac{dD}{dt} = -0.000100$/°C. (0° to 20°)
		35.75 [16] @ 765mm	0.6784 [4,24b]	1.3789 [16]	
		36 to 36.5 [23]	0.6764 [16]	1.3791 [23]	
		34.5 to 35 [4,24b]	0.6832 [23]	1.37973 [22]	
		36.5 to 37 [22] @ 755mm	0.6866 [22] @ 18.25°	1.3780 [24b]	
			0.6975 [4,24a] @ 0°		
			0.7055 [22] @ 0°		
1,1-Dimethyl-cyclopropane					
		21 [9,10]	0.6604 [10]	1.3659 [10]	
			0.6619 [9] @ 17°	1.36869 [9] @ 17°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2-Dimethyl-cyclopropane					
low boiling 		32.4 to 33.2 [21] @ 761mm 28.8 to 29 [2] @ 758.9mm	0.6754 [21] @ 22° 0.6769 [2]	1.37129 [2] 1.38023 [2] $n_{H_\alpha}^{20}$ 1.38702 [2] $n_{H_\beta}^{20}$ 1.39109 [2] $n_{H_\gamma}^{20}$	
high boiling		37.2 to 37.4 [2] @ 755.5mm	0.6928 [2] 0.6985 [2] @ 0° 0.71325 [2] @ 0°	1.38223 [2] 1.36941 [2] $n_{H_\alpha}^{20}$ 1.37617 [2] $n_{H_\beta}^{20}$ 1.37997 [2] $n_{H_\gamma}^{20}$ 1.37493 [21] $n_{H_\alpha}^{19.6}$ 1.38209 [21] $n_{H_\beta}^{19.6}$ 1.38598 [21] $n_{H_\gamma}^{19.6}$	
(Probably *cis-trans* mixture)		32 to 33 [25]	0.6806 [25] 0.7025 [25] @ 0°	1.3763 [25] 1.3774 [25] @ 18° 1.3787 [25] @ 16° 1.3798 [25] @ 14° 1.3813 [25] @ 12° 1.3823 [25] @ 10°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Propylcyclopropane 		68.5 [8]	0.7121 [8] @ 16.7°	1.3957 [8] @ 18° 1.3963 [8] @ 16.7°	
1-Methyl-2-ethyl-cyclopropane 		64.9 to 65.9 [17] 63.9 to 64.9 [17,18]	0.6961 [17,18] @ 21° 0.6959 [17] 0.6960 [17]	1.3876 [17] @ 21° 1.3874 [18] @ 21° 1.3874 [17] 1.3880 [17]	
1,1,2-Trimethyl-cyclopropane 		**57** 59 to 60 [21] @ 768mm 59 to 60 [4] 52.8 [12] @ 756mm 52.5 [12] @ 752mm 56 to 57 [26] @ 750mm	**0.681_4** 0.6949 [12] D_0^{20} 0.6822 [26] @ 19.5° 0.6888 [4,21] @ 15.3°	**1.386_2** 1.3866 [12] 1.3848 [26] @ 19.5° 1.3896 [21] @ 14.5° 1.38738 [21] $n_{H_\alpha}^{14.5}$ 1.39505 [21] $n_{H_\beta}^{14.5}$ 1.39975 [21] $n_{H_\gamma}^{14.5}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3-Trimethyl-cyclopropane 		65 to 67 [26] @ 755mm	0.6946 [26] @ 18°	1.3945 [26]	
C_7H_{14} 1-Methyl-2-propyl-cyclopropane 		92 to 93 [17,19]	0.7206 [17,19] @ 18°	1.4003 [17,19] @ 18°	
1-Methyl-2-isopropyl-cyclopropane 		81 [13] @ 748mm	0.7102 [13] D_0^{20}	1.3927 [13]	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-2-(2-methyl-propyl) cyclopropane 		109.5 to 110.5 [13,25a]	0.7403 [13,25a]	1.4088 [13,25a]	
1-Methyl-1,2-diethyl-cyclopropane 		108 to 109 [25a]	0.7381 [25a]	1.4102 [25a]	
1,1,2-Trimethyl-2-ethylcyclopropane 		103.5 to 104.5 [17]	0.7418 [17] @ 20.4°	1.4129 [17] @ 20.4°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,1-Dimethyl-2-(2-methylpropyl)-cyclopropane 		125 to 126[13]	0.7187[13] D_0^{20} 0.7347[13] D_0^0	1.4032[13]	

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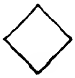
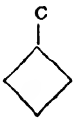
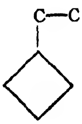
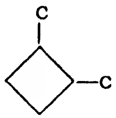
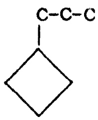
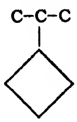
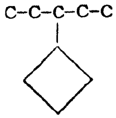
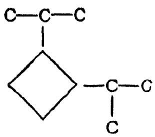
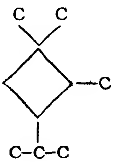
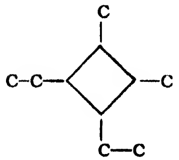
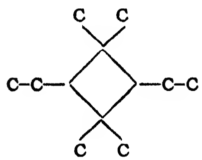
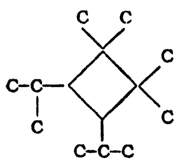
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclobutane 	−80[16]	11 to 12[16]	0.7038[16] @ 0° 0.7185[16] @ −5°	1.37520[16] @ 0°	
C_5H_{10} **Methylcyclobutane** 		**38.6** 39 to 42[1,2] 36.3[4] 34 to 35[19] 36 to 36.5[13] @ 755mm 35 to 36[3] @ 753mm	**0.6931** 0.6931[3] 0.6784[19] 0.6950[3,13] @ 18° 0.6976[3] @ 15° 0.7118[13] @ 0° 0.7120[4] @ 0° 0.7135[3] @ 0° 0.6975[19] @ 0°	**1.3837** 1.3780[19] 1.3836[3] 1.3850[4] 1.3846[3] @ 18° 1.38473[13] @ 18° 1.386[3] @ 15°	$\frac{dD}{dt} = -0.000946$/°C. (0° to 20°) $\frac{dn}{dt} = -0.00048$/°C. (15° to 20°)
C_6H_{12} **Ethylcyclobutane** 	−143.2[14]	**71.5** 72.2 to 72.5[17] 70.7[14] 70[6] @ 754mm	**0.7450** 0.7450[17] 0.7284[6] D_0^{20} 0.7540[17] @ 10° 0.7461[6] D_0^0	**1.402** 1.4004[6] 1.4023[14] 1.4080[17] @ 19.5° 1.4032[6] @ 15°	$\frac{dD}{dt} = -0.00090$/°C. (10° to 20°)

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Dimethyl-cyclobutane 		68 to 70 [20] @ 740mm	0.7122 [20]	1.3988 [20]	
C_7H_{14} **Propylcyclobutane** 		99 to 100 [18] @ 736.2mm	0.7440 [18] @ 19°	1.4119 [18] @ 19°	
Isopropylcyclobutane 		90.5 to 91.5 [5] @ 750mm	0.7464 [5] @ 14.5°	1.4096 [5] @ 19° 1.4125 [5] @ 14.5°	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Cyclobutylpentane 		151 to 152 [7]	0.7945 [7] @ 19°	1.4334 [7] @ 19°	
$C_{10}H_{20}$ **1,2-Diisopropyl-cyclobutane** 		157 to 158.5 [9]	0.7755 [9] 0.7901 [9] @ 0°	1.42787 [9] 1.42565 [9] $n_{H_\alpha}^{20}$ 1.43316 [9] $n_{H_\beta}^{20}$ 1.43755 [9] $n_{H_\gamma}^{20}$	
1,1,2-Trimethyl-3-isopropylcyclobutane 		145 to 146.5 [9]	0.7598 [9] 0.7744 [9] @ 0°	1.41997 [9] 1.41781 [9] $n_{H_\alpha}^{20}$ 1.42527 [9] $n_{H_\beta}^{20}$ 1.42980 [9] $n_{H_\gamma}^{20}$	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2-Dimethyl-3,4-diethylcyclobutane 		155 to 156 [11]	0.7729 [11]	1.42447 [11] 1.42193 [11] $n^{20}_{H_\alpha}$ 1.42950 [11] $n^{20}_{H_\beta}$ 1.43377 [11] $n^{20}_{H_\gamma}$	
$C_{12}H_{24}$ **1,1,3,3-Tetramethyl-2,4-diethylcyclobutane** 		124 to 125 [15]			
$C_{14}H_{28}$ **1,1,2,2-Tetramethyl-3,4-diisopropylcyclobutane** 		106 to 107 [12] @ 27mm	0.8035 [12] @ 17° 0.8181 [12] @ 0°	1.44580 [12] @ 17°	

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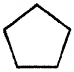
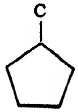
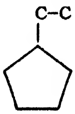
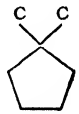
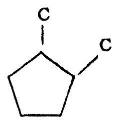
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclopentane	**−94.4**	**49.3_3**	**0.7460**	**1.4068_3**	$\frac{dD}{dt} = -0.000949$/°C. (0° to 30°)
	−94.1 [34]	49.5 [34] @ 767mm	0.73572 [60] @ 30°	1.4057 [73] @ 25.5°	$\frac{dn}{dt} = -0.000484$/°C. (10° to 25°)
	−94.3 [58]	48.4 to 48.6 [61] @ 763mm	0.7506 [64] @ 20.5°	1.4061 [52] @ 21.8°	
	−94.8 [4]	50.25 to 50.75 [64]	0.7543 [21] @ 20.1°	1.4039 [64] @ 20.5	
		49.5 [10]	0.7447 [54]	1.4060 [31]	
		49.4 to 49.5 [19,25]	0.7457 [19,25]	1.4065 [58]	
		49.37 [59]	0.7471 [61]	1.40672 [61]	
		49.35 to 49.40 [4]	0.7510 [18]	1.4070 [19,25]	
		49.35 [12]	0.7531 [31]	1.4075 [54]	
		49.30 [60]	0.7491 [61] @ 17.5°	1.40910 [60] @ 15°	
		49.2 [58]	0.7494 [61] @ 17.1°	1.4094 [4] @ 15°	
		49 to 51 [73]	0.7490 [72] @ 15°	1.4101 [72] @ 15°	
		49.0 [20]	0.7498 [19,25] @ 15°	1.4101 [52] @ 14.7°	
		49 [28,29,30]	0.750 [10] @ 15°	1.4100 [28] @ 13.5°	
		48.5 [31]	0.7503 [12] @ 15°	1.4321 [52] @ −26.8°	
		50.0 [18] @ 756mm	0.75033 [60] @ 15°	1.40464 [21] $n_{H_\alpha}^{20.1}$	
		48.5 to 51 [72] @ 748mm	0.7505 [4] @ 15°	1.40464 [61] $n_{H_\alpha}^{20.0}$	
			0.7500 [23] @ 14.7°	1.40383 [18] $n_{H_\alpha}^{20}$	
			0.754 [55] @ 14.7°	1.40702 [60] $n_{H_\alpha}^{15}$	
			0.7502 [28] $D_{13.5}^{13.5}$	1.4074 [4] $n_{H_\alpha}^{15}$	
			0.7517 [20] @ 12.7°	1.40770 [23] $n_{H_\alpha}^{14.7}$	
			0.7645 [4] @ 0°	1.41173 [21] $n_{H_\beta}^{20.1}$	
			0.7646 [12] @ 0°	1.41166 [61] $n_{H_\beta}^{20.0}$	
			0.76498 [60] @ 0°		

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopentane (*Continued*)					
				1.41126 [18]	
				$n_{H_\beta}^{20}$	
				1.41417 [60]	
				$n_{H_\beta}^{15}$	
				1.4145 [4]	
				$n_{H_\beta}^{15}$	
				1.41481 [23]	
				$n_{H_\beta}^{14.7}$	
				1.41589 [21]	
				$n_{H_\gamma}^{20.1}$	
				1.41520 [61]	
				$n_{H_\gamma}^{20.0}$	
				1.41536 [18]	
				$n_{H_\gamma}^{20}$	
				1.4185 [4]	
				$n_{H_\gamma}^{15}$	
				1.41891 [23]	
				$n_{H_\gamma}^{14.7}$	
				1.40609 [18]	
				n_{He}^{20}	
				1.40981 [23]	
				$n_{He}^{14.7}$	
				1.41318 [60]	
				$n_{He_g}^{15}$	
				1.40668 [60]	
				$n_{He_r}^{15}$	
				1.41723 [60]	
				$n_{He_v}^{15}$	
				1.40927 [60]	
				$n_{He_y}^{15}$	

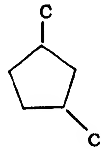
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Methylcyclopentane	**−142.2**	**71.9₄**	**0.7488₈**	**1.4099₅**	$\frac{dD}{dt} = -0.000916$/°C. (0° to 40°)
	−141 [4,7]	72 to 72.2 [67,68,77]	0.7293 [61] @ 41.2°	1.4088 [67] @ 21°	$\frac{dn}{dt} = -0.000475$/°C. (10° to 20°)
	−141.9 [33]	72.00 [60]	0.7303 [61] @ 40.2°	1.4098 [33]	
	−142.4 [58]	72 [10]	0.73948 [60] @ 30°	1.4099 [19,25]	
	−142.7 [58]	71.9 [4,12,19,25,58]	0.7474 [67] @ 21°	1.40998 [61]	
	−143.0 [60]	71.8 to 72 [4]	0.7459 [18]	1.4100 [58,80]	
		71.8 [33]	0.7487 [33]	1.4096 [77] @ 19.5°	
		71.5 to 72.5 [26]	0.7496 [19,25]	1.4104 [65] @ 18°	
		71 to 72.5 [71]	0.7510 [61]	1.4119 [71,73] @ 15.5°	
		71 to 72 [80]	0.7508 [46] D_0^{20}	1.41237 [60] @ 15°	
		70 to 72.5 [46]	0.7488 [77] @ 19.5°	1.4126 [4] @ 15°	
		70 to 71 [24,47]	0.7515 [61] @ 19.5°	1.4111 [28] @ 13.5°	
		71 to 72 [46] @ 755mm	0.7473 [65] @ 18°	1.40788 [61] $n_{H_\alpha}^{20.0}$	
		70.0 to 70.5 [18] @ 755mm	0.7505 [73] @ 15.5°	1.40750 [18] $n_{H_\alpha}^{20}$	
		71 to 72 [38] @ 752mm	0.7505 [71] @ 15°	1.41023 [60] $n_{H_\alpha}^{15}$	
		70.9 to 71.0 [61] @ 751mm	0.7528 [4,12] @ 15°	1.4104 [4] $n_{H_\alpha}^{15}$	
		71 to 72.5 [73] @ 745mm	0.753 [10] @ 15°	1.41511 [61] $n_{H_\beta}^{20.0}$	
		71 [77] @ 743mm	0.7530 [4] @ 15°	1.41465 [18] $m_{H_\beta}^{20}$	
		71.5 to 72 [46] @ 742mm	0.7533 [10] @ 15°	1.4176 [4] $n_{H_\beta}^{15}$	
		71.5 to 72.5 [65] @ 740mm	0.75343 [60] @ 15°	1.41760 [60] $n_{H_\beta}^{15}$	
			0.7541 [19,25] @ 15°	1.41824 [61] $n_{H_\gamma}^{20.0}$	
			0.7562 [61] @ 14.8°	1.41868 [18] $n_{H_\gamma}^{20}$	
			0.7511 [28] $D_{13.5}^{13.5}$		
			0.7666 [4,12] @ 0°		

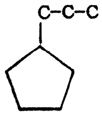
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Methylcyclopentane (*Continued*)					
			0.76737 [60] @ 0°	1.4214 [4] $n^{15}_{H_\gamma}$	
			0.76615 [46] D_0^0	1.40947 [18] n^{20}_{He}	
			0.76641 [46] D_0^0	1.41649 [60] $n^{15}_{He_g}$	
			0.76829 [46] D_0^0	1.40975 [60] $n^{15}_{He_r}$	
				1.42064 [60] $n^{15}_{He_{r'}}$	
				1.41254 [60] $n^{15}_{He_y}$	

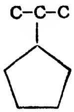
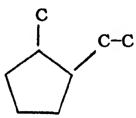
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
Ethylcyclopentane		**103.4**	**0.7657**	**1.4197_6**	$\frac{dD}{dt} = -0.000932°/C.$ (15° to 40°)
	−137.9 [7]	103.6 [51]	0.7478 [51] @ 40°	1.4190 [52] @ 21.8°	$\frac{dn}{dt} = -0.000496/°C.$ (5° to 25°)
		103 to 103.5 [69]	0.7610 [18]	1.4196 [51]	
		103 to 103.2 [7]	0.7632 [51]	1.4201 [19,25]	
		103.0 [19,25]	0.7642 [69]	1.4202 [71,73]	
		103 [52]	0.7654 [71,73]	1.4201 [7] @ 19.1°	
		100.5 to 101.5 [71]	0.7695 [19,25]	1.4188 [69] @ 18°	
		100.5 to 101.0 [18] @ 756mm	0.7669 [7] @ 19.9°	1.4222 [52] @ 14.7°	
		100.5 to 101.5 [73] @ 740mm	0.7658 [69] @ 18°	1.4269 [52] @ 5.8°	
			0.7736 [19,25] @ 15°	1.4425 [52] @ −26.7°	
			0.7711 [7] @ 14.9°	1.41612 [18] $n^{20}_{H_\alpha}$	
				1.4179 [7] $n^{18.85}_{H_\alpha}$	
				1.42332 [18] $n^{20}_{H_\beta}$	
				1.4253 [7] $n^{18.9}_{H_\beta}$	
				1.42798 [18] $n^{20}_{H_\gamma}$	
				1.41840 [18] n^{20}_{He}	

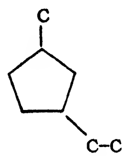
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,1-Dimethyl-cyclopentane			**0.7523**	**1.4126**	
	−76.4 [2]	88 [40] @ 762mm	0.7509 [2]	1.4122 [2]	
	−77 [9]	87.5 [2,44]	0.7551 [9]	1.4131 [40]	
		86.5 to 87.4 [9]	0.7546 [40] D_0^{20}	1.4136 [9,40]	
		87.8 to 87.9 [40] @ 755mm	0.7547 [40] D_0^{20}	1.4139 [44]	
		87.2 to 87.9 [9] @ 748mm	0.7552 [44] D_0^{20}	1.4147 [9] @ 18°	
			0.7590 [9] @ 15°	1.4125 [9] $n_{H_\alpha}^{18}$	
				1.4240 [9] $n_{H_\alpha}^{18}$	
***cis*-1,2-Dimethyl-cyclopentane**			**0.7723**		
	−62 [6]	99.25 [6]	0.7718 [6]	1.42014 [6] $n_{H_\alpha}^{20}$	
		99.23 [16]	0.77266 [16]	1.42748 [6] $n_{H_\beta}^{20}$	
		98.40 [6] @ 741mm	0.7764 [6] @ 15°	1.43180 [6] $n_{H_\gamma}^{20}$	
				1.42202 [6] $n_{He_y}^{20}$	

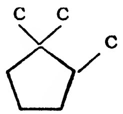
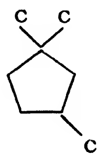
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***trans*-1,2-Dimethyl-cyclopentane**					
	− 120 [6]	91.8 [6] 91.78 [16] 90.95 [6] @ 741mm	0.7495 [6] 0.75137 [16] 0.7541 [6] @ 15°	1.40934 [6] $n^{20}_{H_\alpha}$ 1.41659 [6] $n^{20}_{H_\beta}$ 1.42077 [6] $n^{20}_{H_\gamma}$ 1.41155 [6] $n^{20}_{He_y}$	
1,2-Dimethyl-cyclopentane					
	− 119.0 [50]	92.7 to 93 [40] @ 762mm 95.8 to 97.6 [8] 94 to 99 [11] 94 to 98 [56,57] 93 to 94 [49] 92 to 95 [9] 92 to 93 [40] @ 758mm 94 to 96 [40] @ 754mm	0.7664 [56,57] 0.766 [9] 0.764 [11] 0.7613 [49] 0.7681 [8] @ 15° 0.7534 [40] D_0^{20} 0.7629 [40] D_0^{20} 0.7581 [40] $D_0^{18.5}$	1.4187 [56,57] 1.417 [11] 1.41745 [49] 1.4126 [40] 1.4160 [40] 1.4150 [40] @ 18.5° 1.4166 [56,59] $n^{20}_{H_\alpha}$ 1.4241 [56,59] $n^{20}_{H_\beta}$ 1.4287 [56,59] $n^{20}_{H_\gamma}$	

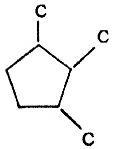
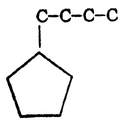
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
d-1,3-Dimethyl-cyclopentane 		90.5 to 91 [66] @ 755mm	0.7497 [66] @ 18°	1.4110 [66] @ 18°	$[\alpha]_D^{18} = +1.78°$ [66]
1,3-Dimethyl-cyclopentane	−136.75 [3] −136.7 [59a]	93 [65] 90.7 [8] 90.68 to 90.80 [3] 90.6 to 90.8 [3,5] 90.5 [19,25] 94 to 95 [39] @ 755mm 91 to 91.5 [66] @ 751mm 90.18 to 90.30 [3] @ 749mm 89.9 to 90.1 [3] @ 744mm 93 [78] @ 743mm	0.7410 [66] @ 24° 0.7463 [19,25] 0.7543 [65,78] 0.7562 [39] D_0^{20} 0.7456 [3,5] @ 19.7° 0.7498 [3,5,8] @ 15° 0.7504 [19,25] @ 15°	1.4066 [66] @ 24° 1.4076 [3,5] @ 20.8° 1.4096 [19,25] 1.4130 [78] 1.4144 [39] 1.4104 [3,5] @ 16°	
x,x-Dimethyl-cyclopentane		91 to 94 [10] 91 to 91.4 [79]			

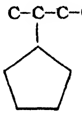
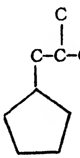
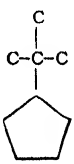
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Propylcyclopentane 	 −120.3 [7] −121.7 [59a]	**130.8** 131.3 [7] to 131.5 130.7 [51] 130.6 [19,25] 129.5 [18] @ 754mm 130 to 131.5 [73] @ 751.3mm 126 to 128 [73] @ 739mm	**0.7765** 0.7601 [51] @ 40° 0.7755 [73] @ 21° 0.7772 [7] @ 20.2° 0.7718 [18,52] 0.7756 [51] 0.7766 [19,25] 0.7789 [71,73] @ 16.5° 0.7812 [19,25] @ 15° 0.7814 [7] @ 14.9°	**1.4265$_3$** 1.4256 [52] @ 22° 1.4259 [73] @ 21° 1.4263 [52] 1.4266 [7] 1.4269 [19,25,51] 1.4270 [71,73] @ 16.5° 1.4289 [52] @ 14.7° 1.4329 [52] @ 6.8° 1.4353 [52] @ 0° 1.4480 [52] @ −26.3° 1.42285 [18] $n^{20}_{H_\alpha}$ 1.4245 [7] $n^{19.9}_{H_\alpha}$ 1.43040 [18] $n^{20}_{H_\beta}$ 1.4319 [7] $n^{19.95}_{H_\beta}$ 1.43474 [18] $n^{20}_{H_\gamma}$ 1.42470 [18] n^{20}_{He}	$\frac{dD}{dt} = -0.000849$/°C. (15° to 40°) $\frac{dn}{dt} = -0.000461$/°C. (−30° to +25°)

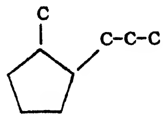
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
Isopropylcyclopentane			**0.7766**	**1.4264**	$\frac{dD}{dt} = -0.00086/°C.$ (15° to 40°)
	−112.7 [52]	126.8 [51] 128 to 129 [18] @ 754mm 123 to 124 [37] @ 731.6mm	0.7593 [51] @ 40° 0.7717 [18] 0.7764 [51] 0.77640 [52] 0.7785 [37] @ 18°	1.4252 [52] @ 22° 1.4261 [51] 1.4273 [37] @ 18° 1.4284 [52] @ 15° 1.4317 [52] @ 7.7° 1.4468 [52] @ −26.3° 1.42255 [18] $n_{H_\alpha}^{20}$ 1.43010 [18] $n_{H_\beta}^{20}$ 1.43454 [18] $n_{H_\gamma}^{20}$ 1.42470 [18] n_{He}^{20}	$\frac{dn}{dt} = -0.00042/°C.$ (−25° to +25°)
***cis*-1-Methyl-2-ethyl-cyclopentane**			**0.7850_1**		$\frac{dD}{dt} = -0.000802/°C.$ (0° to 20°)
		128.24 to 128.26 [16] 127.7 to 128 [13]	0.78508 [16] 0.7846 [13] 0.8011 [13] @ 0°	1.4291 [13] 1.4269 [13] $n_{H_\alpha}^{20}$ 1.4344 [13] $n_{H_\beta}^{20}$ 1.4387 [13] $n_{H_\gamma}^{20}$	

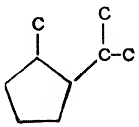
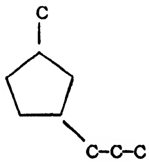
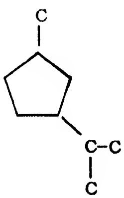
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***trans*-1-Methyl-2-ethylcyclopentane**			**0.7691**		$\frac{dD}{dt} = -0.000843/°C.$ (0° to 20°)
		121.4 to 121.75[13] 121.35 to 121.40[16]	0.7696[13] 0.76912[16] 0.7860[13] @ 0°	1.4220[13] 1.4198[13] $n_{H_\alpha}^{20}$ 1.4272[13] $n_{H_\beta}^{20}$ 1.4314[13] $n_{H_\gamma}^{20}$	
1-Methyl-2-ethyl-cyclopentane					
		124[48] 121[49] @ 753mm	0.7728[49]	1.42835[49]	
***d*-1-Methyl-3-ethyl-cyclopentane**					$[\alpha]_D = +4.34°$[66]
		120.5 to 121[66] @ 756mm	0.7669[66] @ 16°	1.4214[66] @ 16°	

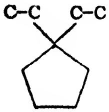
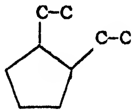
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,1,2-Trimethyl-cyclopentane (Dihydroisolaurolene) 		114 [74,75] 114 [74] @ 755mm 113 to 113.5 [17,41] @ 750mm 113 to 114 [41] @ 749mm	**0.7710$_4$** 0.7694 [17] D_{25}^{25} 0.7727 [17] D_{20}^{20} 0.7661 [41] D_0^{20} 0.7719 [74] @ 19° 0.7728 [74,75] @ 18° 0.7686 [74] @ 17° 0.7746 [21] @ 16.2° 0.77463 [17] @ 16.2° 0.7762 [17,41] D_{15}^{15} 0.7706 [41] D_{15}^{15} 0.7800 [17] D_{10}^{10} 0.7847 [17] @ 4°	1.4199 [41] 1.4234 [74] @ 19° 1.4238 [74,75] @ 18° 1.4223 [74] @ 17° 1.42244 [17, 21] $n_{H_\alpha}^{16.2}$ 1.42998 [17, 21] $n_{H_\beta}^{16.2}$ 1.43398 [17, 21] $n_{H_\gamma}^{16.2}$	$\frac{dD}{dt} = -0.000869$/°C. (0° to 25°)
1,1,3-Trimethyl-cyclopentane 		115 to 116 [81]	0.7703 [81]	1.4223 [81]	

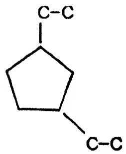
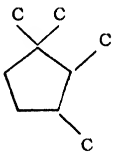
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D^{20}_{4}	n^{20}_{D}	*Additional Data*
1,2,3-Trimethyl-cyclopentane (Dihydrolaurolene) 		114 to 115 [74,75] 111.5 to 114 [17]	0.7567 [17] D^{25}_{25} 0.7596 [17] D^{20}_{20} 0.7588 [17,21] @ 19.8° 0.7688 [74,75] @ 19° 0.7633 [17] D^{15}_{15} 0.7718 [17] @ 4°	1.4230 [74,75] @ 19° 1.41424 [17,21] $n^{19.8}_{H_\alpha}$ 1.42162 [71,21] $n^{19.8}_{H_\beta}$ 1.42591 [17,21] $n^{19.8}_{H_\gamma}$	
C_9H_{18} **Butylcyclopentane**			**0.7843**	**1.4315**	$\frac{dD}{dt} = -0.000781/°C.$ (15° to 40°)
	−108.2 [7] −112.1 [59a]	154.5 to 156 [36] @ 762.7mm 157.2 [19,25] 156.8 [7,51] 154.5 to 155 [52] @ 750mm	0.7687 [51] @ 40° 0.7848 [7] @ 20.2° 0.7832 [51] 0.7847 [19,25] 0.7862 [36] @ 16° 0.7886 [19,25] @ 15° 0.7887 [7] @ 14.95°	1.4309 [52] @ 21.9° 1.4314 [7] @ 20.2° 1.4310 [19,25] 1.4315 [52] 1.4317 [51] 1.4336 [36] @ 16° 1.4336 [52] @ 14.8° 1.4380 [52] @ 6.2° 1.4529 [52] @ −26.6° 1.4292 [7] $n^{20.35}_{H_\alpha}$ 1.4366 [7] $n^{20.4}_{H_\beta}$	$\frac{dn}{dt} = -0.000460/°C.$ (−30° to +25°)

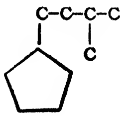
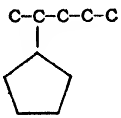
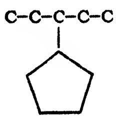
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2-Cyclopentylbutane 		154.6 [51] 152.5 to 153.5 [36,37] @ 763.7mm 151 to 152 [52] @ 741mm 152 to 154 [63] @ 725mm	**0.7944_6** 0.7787 [51] @ 40° 0.79407 [52] 0.7941 [51] 0.7971 [36,37] @ 18° 0.810 [63] @ 0°	**1.4362** 1.4356 [52] @ 21.3° 1.4361 [51] 1.4370 [36,37] @ 18° 1.4386 [52] @ 14.7° 1.4415 [52] @ 7.8° 1.4554 [52] @ − 26.3°	$\frac{dD}{dt} = -0.000790/°C.$ (0° to 40°) $\frac{dn}{dt} = -0.00042/°C.$ (−25° to 25°)
2-Methyl-1-Cyclopentylpropane 		148 to 149 [18] @ 756mm	0.7795 [18]	1.42738 [18] $n_{H_\alpha}^{20}$ 1.43516 [18] $n_{H_\beta}^{20}$ 1.43980 [18] $n_{H_\gamma}^{20}$ 1.42950 [18] n_{He}^{20}	
2-Methyl-2-cyclopentylpropane (*tert*-Butylcyclopentane) 	− 96 [51]	145.2 [51]	0.7753 [51] @ 40° 0.7911 [51]	1.4342 [51] 1.4341 [51] 1.4320 [51] $n_{H_\alpha}^{20}$ 1.4396 [51] $n_{H_\beta}^{20}$	$\frac{dD}{dt} = -0.00079/°C.$ (20° to 40°)

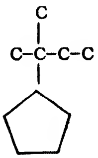
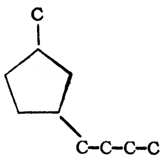
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***cis*-1-Methyl-2-propyl-cyclopentane**					$\frac{dD}{dt} = -0.000786/°C.$ (0° to 20°)
	−104.9 [15]	152.58 [15,16]	0.79212 [15,16] 0.80783 [15] @ 0°	1.43432 [15] 1.43211 [15] $n^{20}_{H_\alpha}$ 1.43962 [15] $n^{20}_{H_\beta}$ 1.44395 [15] $n^{20}_{H_\gamma}$ 1.43858 [15] $n^{20}_{He_g}$ 1.43171 [15] $n^{20}_{He_r}$ 1.43442 [15] $n^{20}_{He_y}$	
***trans*-1-Methyl-2-propylcyclopentane**			**0.7774_3**		$\frac{dD}{dt} = -0.000793/°C.$ (0° to 20°)
		146.37 [16] 146.37 to 146.38 [15]	0.7774 [16] 0.77743 [15] 0.79328 [15] @ 0°	1.42740 [15] 1.42526 [15] $n^{20}_{H_\alpha}$ 1.43279 [15] $n^{20}_{H_\beta}$ 1.43705 [15] $n^{20}_{H_\gamma}$ 1.43173 [15] $n^{20}_{He_g}$ 1.42496 [15] $n^{20}_{He_r}$ 1.42750 [15] $n^{20}_{He_y}$	

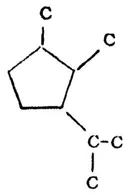
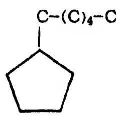
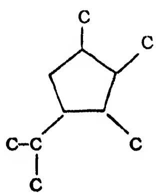
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-2-isopropyl-cyclopentane 		142.5 [43] @ 759mm	0.7792 [43] D_0^{20} 0.7833 [43] D_0^{15}	1.4279 [43]	
1-Methyl-3-propyl-cyclopentane 		146 to 148 [70] @742mm			
1-Methyl-3-isopropyl-cyclopentane 		140 to 142.5 [35] @ 764.8mm 142 to 144 [62] 133 to 134 [30] 132 to 134 [30] 142.5 [43] @ 759mm 141.5 to 142 [22] @ 758mm	0.7730 [62] @ 22° 0.7792 [43] 0.773 [30] @ 19° 0.7750 [35] @ 18.5° 0.7799 [22] @ 15.2°	1.4236 [62] @ 22° 1.4279 [43] 1.4250 [30] @ 19° 1.4257 [35] @ 18.5° 1.42744 [22] $n_{H_\alpha}^{15.2}$ 1.43505 [22] $n_{H_\beta}^{15.2}$ 1.43947 [22] $n_{H_\gamma}^{15.2}$	

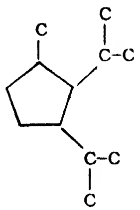
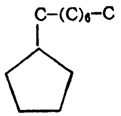
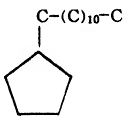
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,1-Diethylcyclopentane 		150.5 [42] @ 757mm.	0.8028 [42] D_4^{20}	1.4388 [42]	
***cis*-1,2-Diethylcyclopentane** 	−118.7 [14]	153.55 to 153.58 [14] 153.58 [16]	0.79599 [14, 16] 0.81165 [14] @ 0°	1.43552 [14] 1.43562 [14] 1.43332 [14] $n_{H_\alpha}^{20}$ 1.43343 [14] $n_{H_\alpha}^{20}$ 1.44090 [14] $n_{H_\beta}^{20}$ 1.44100 [14] $n_{H_\beta}^{20}$ 1.44528 [14] $n_{H_\gamma}^{20}$ 1.44538 [14] $n_{H_\gamma}^{20}$	$\frac{dD}{dt} = -0.000783$/°C. (0° to 20°)
***trans*-1,2-Diethylcyclopentane**	−95.6 [14]	147.53 [16] 147.53 to 147.55 [14]	0.78316 [16] 0.78318 [14] 0.79858 [14] @ 0°	1.42950 [14] 1.42738 [14] $n_{H_\alpha}^{20}$ 1.43487 [14] $n_{H_\beta}^{20}$ 1.43920 [14] $n_{H_\gamma}^{20}$	$\frac{dD}{dt} = -0.000771$/°C. (0° to 20°)

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Diethylcyclopentane		151 to 152 [42] @ 755mm	0.7952 [42] D_0^{20}	1.4353 [42]	
1,3-Diethylcyclopentane 		148 to 149 [45] @ 767mm	0.7851 [45] D_0^{20}	1.4298 [45]	
1,1,2,3-Tetramethylcyclopentane 			0.7820 [21] @ 14.1°	1.42781 [21] $n_{H_\alpha}^{14.1}$ 1.43541 [21] $n_{H_\beta}^{14.1}$ 1.43986 [21] $n_{H_\gamma}^{14.1}$	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Methyl-1-cyclopentylbutane 		171 to 172 [36] 168 to 170 [32]	0.7837 [32] @ 25° 0.7868 [36] @ 20.5°	1.4321 [32] @ 25° 1.4340 [36] @ 20.5°	
2-Cyclopentylpentane 		177.5 [52]	0.7955 [52] @ 40° 0.8099 [52]	1.4438 [52]	$\frac{dD}{dt} = -0.00072/°C.$ (20° to 40°)
3-Cyclopentylpentane 		174 to 176 [37]	0.8116 [37] @ 19°	1.4443 [37] @ 19°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-2-cyclopentylbutane				1.441$_7$	$\frac{dD}{dt} = -0.0007_4$/°C. (20° to 40°)
		173.9 [51]	0.7923 [51] @ 40° 0.8071 [51]	1.4412 [52] @ 21.3° 1.4457 [51] 1.4439 [52] @ 14.6° 1.4470 [52] @ 7.7° 1.4619 [52] @ −26.6° 1.4433 [51] $n_{H_\alpha}^{20}$ 1.4511 [51] $n_{H_\beta}^{20}$	$\frac{dn}{dt} = -0.00043_4$/°C. (−25° to +20°)
1-Methyl-3-butylcyclopentane					
		170.2 [8] @ 750.7mm	0.7840 [8] @ 15°	1.4321 [8] @ 15° 1.4298 [8] $n_{H_\alpha}^{15}$ 1.4418 [8] $n_{H_\gamma}^{15}$	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2-Dimethyl-3-isopropylcyclopentane 		148 to 149 [27] 146 to 148 [30] 161.4 to 161.9 [53] @ 758mm 159 to 160.5 [35] @ 757.6mm 159 to 161 [35] @ 757mm 49.5 to 49.8 [53] @ 14.5mm	0.7877 [35] @ 21° 0.7883 [35] @ 21° 0.786 [30] @ 16° 0.793 [27] @ 15° 0.7929 [53] @ 15°	1.4319 [35] @ 21° 1.4328 [35] @ 21° 1.4344 [53] @ 16.5° 1.4337 [30] @ 16° 1.4364 [27] @ 15°	Kasansky (33) claims that the compound prepared by Godchot and Taboury (29) [which is the same compound as that of Godchot (28)] is not 1,2-dimethyl-3-isopropylcyclopentane.
$C_{11}H_{22}$ **Hexylcyclopentane** 		204 to 206 [76] @ 748mm	0.7903 [76]	1.4370 [76]	
1,2,3-Trimethyl-4-isopropylcyclopentane 		157 to 158 [27]	0.7833 [27] @ 13°	1.4326 [27] @ 13°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-2,3-diisopropylcyclopentane 		150 to 152 [30]	0.781 [30] @ 17°	1.4318 [30] @ 17°	
$C_{13}H_{26}$ **Octylcyclopentane** 		133 to 134 [76] @ 26mm	0.8156 [76] @ 18°	1.4483 [76] @ 18°	
$C_{17}H_{34}$ **Dodecylcyclopentane** 		175 [1] @ 15mm	0.8280 [1] @ 18°	1.45737 [1]	

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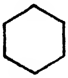
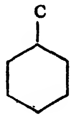
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
Cyclohexane 	4.5 [30a] 4.7 [155] 5.95 [37] 6.10 [147] 6.2 [88] 6.2 to 6.4 [151] 6.25 [12] 6.28 [31] 6.34 [85] 6.4 [32,126,150,160] 6.40 [136] 6.45 [9,13] 6.48 [33] 6.5 [23,105,112] 6.55 [99] 6.7 [98]	**80.7₉** 81.06 [20] @764.59mm 80.2 [145] @ 763mm 81 to 82.7 [89] 81 to 81.5 [10] 81 [73,150] 80.93 [9] 80.9 [24,30a] 80.8 to 80.9 [13,160] 80.80 [136] 80.8 [12,16,29,126] 80.6 to 80.8 [4] 80.0 to 80.2 [5] 80 [123] 79 to 80 [10] 79 [131] 78.5 to 79.5 [127] 80.8 [155] @759.75mm 80 to 80.5 [38] @ 759.5mm 80.5 [173] @ 758mm 80.5 [23] @ 756mm 80.66 [20] @755.69mm 81 [105,112] @ 755mm 80.5 to 80.7 [68] @ 755mm 80.65 [155] @ 754.7mm 79 to 79.5 [1] @ 752mm 72 to 73 [55] @ 752mm 80.3 [33] @ 750mm	**0.7781₈** 0.72056 [155] @ 80° 0.72215 [98] @ 78.05° 0.73057 [155] @ 70° 0.73997 [155] @ 60° 0.74060 [134] @ 60° 0.74416 [98] @ 50.95° 0.74957 [155] @ 50° 0.75513 [105] @ 44.6° 0.7555 [145] @ 44.6° 0.7564 [145] @ 43.6° 0.7570 [145] @ 42.9° 0.75942 [98] @ 40.21° 0.75907 [155] @ 40° 0.76853 [155] @ 30° 0.7692 [18] @ 30° 0.7730 [145] @ 25.6° 0.77384 [98] @ 25.08° 0.77354 [147] @ 25° 0.7737 [13] @ 25° 0.7741 [38] @ 25° 0.7694 [29] D^{25}_{25}	**1.4264₈** 1.4235 [30] @ 25° 1.42370 [147] @ 25° 1.4274 [9] @ 25° 1.4275 [13] @ 25° 1.4242 [1] 1.4254 [30a] 1.4262 [126] 1.4263 [13] 1.42636 [67] 1.42648 [68] 1.4265 [89] 1.42656 [145] 1.4266 [90] 1.42691 [151] 1.427 [3] 1.4275 [10] 1.4266 [160] @ 19.5° 1.4269 [160] @ 18° 1.4271 [123] @ 17.5° 1.42446 [29] @ 17.4° 1.42806 [4] @ 16.1° 1.42886 [136] @ 15° 1.429001 [31] @ 15° 1.4371 [127] @ 11° 1.43119 [5] @ 10.85° 1.42225 [23] $n^{25}_{H_\alpha}$	$\frac{dT}{dp} = 0.0002548\frac{T^2}{p}$ degrees/(40mm to 760mm) $\frac{dT}{dp} = 0.0420$ degrees /mm at boiling point ($p = 760$mm) Average value of $\frac{dT}{dp}$ between 740 and 760 mm. $= 0.0425$ degrees /mm. $\frac{dD}{dt} = -0.000972_3(1-0.000234_5t)$/°C. (7° to 80°) $\frac{dn}{dt} = -0.000470_4$/°C. (10° to 25°) Gifford and Lowry [31] have determined the index of refraction of cyclohexane at 15° for various wave lengths and have summarized their results in the following dispersion formula $(n^{15}_\lambda)^2 = 2.011046 + \frac{0.0102467}{\lambda^2 - 0.013977}$ (3282Å to 7701Å) Similarly, Lowry and Allsopp [67] have studied the dependence of index of refraction upon wave length. Their equation is $(n^{20}_\lambda)^2 = 2.00519 + \frac{0.0098035}{\lambda^2 - 0.011923}$ (2450Å to 6707Å)

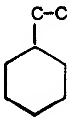
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
Cyclohexane *(Continued)*		80.0[155] @ 741.3mm	0.7758[145] @ 22.4°	1.42437[145] $n^{20}_{H_\alpha}$	
		80.5 to 81[173] @ 740mm	0.7772[145] @ 20.8°	1.42476[23] $n^{20}_{H_\alpha}$	
		80.1 to 80.2[90] @ 738mm	0.7763[160]	1.42211[29] $n^{17.4}_{H_\alpha}$	
		79 to 79.5[151] @ 723mm	0.7769[1,173]	1.42589[4] $n^{16.1}_{H_\alpha}$	
		75.37[85] @ 646.0mm	0.7775[24, 30a, 68]	1.42698[23] $n^{15}_{H_\alpha}$	
		70.0[155] @ 540.8mm	0.7780[145]	1.42777[25] $n^{13.5}_{H_\alpha}$	
		60.0[155] @ 385.0mm	0.7782[23]	1.42910[5] $n^{10.85}_{H_\alpha}$	
		19.78[98] @ 78.40mm	0.7783[23]	1.42971[23] $n^{25}_{H_\beta}$	
		18.44[20] @ 70.71mm	0.77849[12]	1.43184[145] $n^{20}_{H_\beta}$	
		6.90[98] @ 40.60mm	0.7786[90]	1.43229[23] $n^{20}_{H_\beta}$	
		6.14[98] @ 38.70mm	0.7788[89]	1.42960[29] $n^{17.4}_{H_\beta}$	
			0.790[11]	1.43345[4] $n^{16.1}_{H_\beta}$	
			0.7731[29] D^{20}_{20}	1.43447[23] $n^{15}_{H_\beta}$	
			0.7727[72] D^{20}_0	1.43531[25] $n^{13.5}_{H_\beta}$	
			0.7788[160] @ 19.5°	1.43668[5] $n^{10.85}_{H_\beta}$	
			0.7808[112] @ 18°	1.43415[23] $n^{25}_{H_\gamma}$	
			0.781[151] @ 18°	1.43580[145] $n^{20}_{H_\gamma}$	
			0.7834[123] @ 17°		
			0.78221[96] @ 16.12°		
			0.7808[4] @ 16.1°		
			0.7820[25] @ 16.1°		
			0.7824[26] @ 15.9°		
			0.7820[24,30a] @ 15°		
			0.78224[156] @ 15°		

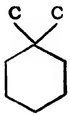
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclohexane (*Continued*)					
			0.7830 [18] @ 15°	1.43668 [23] $n_{H_\gamma}^{20}$	
			0.78310 [136] @ 15°	1.43391 [29] $n_{H_\gamma}^{17.4}$	
			0.7771 [29] D_{15}^{15}	1.43773 [4] $n_{H_\gamma}^{16.1}$	
			0.774 [72] D_{15}^{15}	1.43892 [23] $n_{H_\gamma}^{15}$	
			0.78280 [155] @ 14.5°	1.43972 [25] $n_{H_\gamma}^{13.5}$	
			0.78435 [105] @ 13.5°	1.44116 [5] $n_{H_\gamma}^{10.85}$	
			0.7844 [25] @ 13.5°	1.5232 [142] $n_{2150}^{15.3}$	
			0.7869 [5] @ 11.2°	1.4388 [142] $n_{4200}^{15.3}$	
			0.7875 [127] @ 11°		
			0.7872 [5] @ 10.85°		
			0.78715 [155] @ 10.7°		
			0.7812 [29] D_{10}^{10}		
			0.79063 [98] @ 7.00°		
			0.7865 [29] @ 4°		
			0.7903 [29] @ 0°		
			0.7967 [16] @ 0°		
			0.8352 [99] @ 0°		
			0.7902 [72] D_0^0		

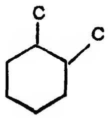
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
Methylcyclohexane 	 −126.3 [119,126,132] −126.4 [126,135,136,148] −126.7 [137] −126.85 [134] −126.9 [88]	**100.3** 100.0 [23] @ 780mm 100.4 to 100.7 [145] @ 773mm 100.0 [23] @ 770mm 100 [145] @ 770mm 103 [51] 102 [63] 101.20 [136] 101.1 [112] 101 to 102 [42,123,158] 101 [3,133,134] 101.0 [24,30a] 100.8 to 100.9 [137] 100.8 [126] 100.80 [148] 100.4 [16] 100.30 [135] 100 to 101 [111] 100 [30a] 99.8 to 100.8 [118] 99.4 to 102 [89] 99 to 101 [10] 98 to 100 [127] 99.5 to 100 [23,145] @ 759mm 100 [32] @ 758mm 100.5 [4] @ 754mm 100.2 [73] @ 751mm	**0.7692_7** 0.7174 [25] @ 78.8° 0.7344 [145] @ 62.1° 0.7512 [145] @ 42.1° 0.76030 [136] @ 30° 0.7606 [18] @ 30° 0.7679 ** [143,145] 0.7687 [1,68,89] 0.7688 [137] 0.7689 [10] 0.7693 [159] 0.7694 ** [144,145,159] 0.76944 [148] 0.7696 [24,30a] 0.7697 [73] 0.7704 ** [143,145] 0.77304 * [23] 0.769 [118] D^{20}_{20} 0.7641 [53] D^{20}_0 0.7695 [43] D^{20}_0 0.7622 [51] @ 18.5° 0.7647 [158] @ 18° 0.7662 [51] @ 18° 0.7718 [25] @ 16.9° 0.7725 [25] @ 16.3°	**1.4230_9** 1.4198 [1] 1.4227 [10] 1.423 [3] 1.4230 [43,89,118] 1.42306 [68] 1.4231 [126] 1.4232 [137] 1.4239 [24,30a] 1.42410 ** [143,145] 1.4243 [159] @ 19° 1.41705 [51] @ 18.5° 1.4243 [159] @ 18° 1.4242 [123] @ 17.6° 1.4235 [123] @ 17.5° 1.42531 [4] @ 15.5° 1.42535 [43,133,136] @ 15° 1.4291 [127] @ 11° 1.39116 [25] $n^{78.8}_{H_\alpha}$ 1.42081 ** [143,145] $n^{20.0}_{H_\alpha}$ 1.42085 [148] $n^{20.00}_{H_\alpha}$ 1.42093 [144,145] $n^{20.0}_{H_\alpha}$	$\frac{dD}{dt} = -0.000857$/°C. (0° to 80°) $\frac{dn}{dt} = -0.000481$/°C. (10° to 20°) *The density and refractive index values of Eisenlohr and Gorr (ref. 23) are each the mean of five separate determinations reported in the paper. **Vogel (ref. 143,144, 145) reports the existence of three isomeric liquid forms of cyclohexane, the individual constants of which are given in the tables.

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Methylcyclohexane (*Continued*)					
		100.3 to 100.9 [68] @ 745mm 100 to 100.2 [1] @ 742mm	0.7773 [4] @ 15.5° 0.77340 [136] @ 15° 0.7736 [24,30a] @ 15° 0.7737 [18] @ 15° 0.774 [73] D_{15}^{15} 0.7693 [159] @ 14° 0.7738 [32] $D_{13.5}^{13.5}$ 0.7791 [127] @ 11° 0.780 [16] @ 0° 0.7859 [112] @ 0° 0.78640 [135] @ 0° 0.78650 [136] @ 0° 0.7868 [18] @ 0° 0.7804 [53] D_0^0 0.7859 [73] D_0^0 0.7887 [42] D_0^0	1.42167 [143, 145] $n_{H_\alpha}^{20.00}$** 1.42311 [23] $n_{H_\alpha}^{20}$* 1.42296 [25] $n_{H_\alpha}^{16.9}$ 1.42330 [25] $n_{H_\alpha}^{16.3}$ 1.42308 [4] $n_{H_\alpha}^{15.5}$ 1.39816 [25] $n_{H_\beta}^{78.8}$ 1.42838 [148] $n_{H_\beta}^{20.00}$ 1.42839 ** [143,145] $n_{H_\beta}^{20.0}$ 1.42846 ** [144,145] $n_{H_\beta}^{20.0}$ 1.42915 [143, 145] $n_{H_\beta}^{20.0}$** 1.43082 [23] $n_{H_\beta}^{20}$* 1.43053 [25] $n_{H_\beta}^{16.9}$ 1.43088 [25] $n_{H_\beta}^{16.3}$ 1.43058 [4] $n_{H_\beta}^{15.5}$ 1.40230 [25] $n_{H_\gamma}^{78.8}$ 1.43230 [143, 145] $n_{H_\gamma}^{20.0}$	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Methylcyclohexane (*Continued*)				1.43250 [144, 145] $n_{H_\gamma}^{20.0}$ ** 1.43285 [148] $n_{H_\gamma}^{20.00}$ 1.43301 [143, 145] $n_{H_\gamma}^{20.0}$ 1.43524 [23] $n_{H_\gamma}^{20}$ * 1.43498 [25] $n_{H_\gamma}^{16.9}$ 1.43533 [25] $n_{H_\gamma}^{16.8}$ 1.43502 [4] $n_{H_\gamma}^{15.5}$ 1.42540 [23] n_{He}^{20} *	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
Ethylcyclohexane		**131.8**	**0.7878$_2$**	**1.4329$_3$**	$\frac{dD}{dt} = -0.000770$/°C. (0° to 20°)
	−111.40 [97]	132 to 134 [140]	0.7899 [1] @ 25°	1.4278 [1] @ 25°	$\frac{dn}{dt} = -0.000436$/°C. (10° to 25°)
	−128.9 [133]	131.89 [97]	0.7771 [53]	1.43079 [97] @ 25°	
		131.8 [133]	0.7840 [23,57]	1.4320 [24,30a]	
		131.6 [24,30a]	0.7854 [66]	1.4324 [57]	
		131 to 132 [10]	0.7872 [68]	1.43283 [68]	
		130.1 to 130.7 [118]	0.7875 [24,30a]	1.4329 [10]	
		130 [112]	0.78804 [97]	1.4332 [118]	
		128.5 to 130 [127]	0.787 [118] D^{20}_{20}	1.4343 [66]	
		128 to 129 [111]	0.793 [140] @ 17°	1.436 [140] @ 17°	
		129.5 [23] @ 756mm	0.7914 [24,30a] @ 15°	1.4373 [127] @ 11°	
		132 to 133 [53] @ 755mm	0.7972 [127] @ 11°	1.43041 [23] $n^{20}_{H_\alpha}$	
		130 to 131 [66] @ 751mm	0.7997 [57] @ 0°	1.43803 [23] $n^{20}_{H_\beta}$	
		130 to 132 [68] @ 745mm	0.8025 [112] @ 0°	1.44272 [23] $n^{20}_{H_\gamma}$	
		129.8 to 130 [1] @ 743mm	0.8026 [111] @ 0°	1.43251 [23] n^{20}_{He}	
		128 [152] @ 724mm	0.7913 [53] D^0_0		

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Dimethyl-cyclohexane		**$119._9$**	**0.7810**	**1.4293**	$\frac{dD}{dt} = -0.000804$/°C. (0° to 25°)
	−34.1 [80]	120 [19] @ 766mm	0.7798 [19] D_{25}^{25}	1.4285 [170] @ 21°	$\frac{dn}{dt} = -0.000355$/°C. (10° to 25°)
	−35.1 [15]	118 to 118.5 [30] @ 764mm	0.7786 [170] @ 21°	1.4289 [30]	
		121.2 to 121.8 [15]	0.78073 [80]	1.4342 [163] @ 18°	
		120 [36,63]	0.7820 [163]	1.4351 [36] @ 17.6°	
		119.7 to 119.9 [80]	0.7825 [30]	1.4314 [15] @ 15°	
		119.2 to 119.7 [166]	0.7832 [19] D_{20}^{20}	1.4320 [166] @ 11°	
		118.5 to 120 [163]	0.7890 [36] @ 17.6°	1.42958 [19] $n_{H_\alpha}^{15.5}$	
		119.2 to 119.7 [70] @ 752.8mm	0.7843 [166] @ 16°	1.4290 [15] $n_{H_\alpha}^{15}$	
		119.5 to 120 [15] @ 751mm	0.775 [16] @ 15°	1.43728 [19] $n_{H_\beta}^{15.5}$	
			0.7840 [15] @ 15°	1.44203 [19] $n_{H_\gamma}^{15.5}$	
			0.7864 [19] D_{15}^{15}	1.4413 [15] $n_{H_\gamma}^{15}$	
			0.7947 [19] @ 4°	1.42359 [80] $n_{He_r}^{26.4}$	
			0.79709 [80] @ 0°	1.42680 [80] $n_{He_r}^{18.8}$	
				1.42635 [80] $n_{He_y}^{26.4}$	
				1.42959 [80] $n_{He_y}^{18.8}$	
				1.43489 [80] $n_{He_g}^{26.4}$	
				1.43822 [80] $n_{He_g}^{18.8}$	

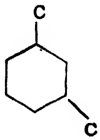
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***cis*-1,2-Dimethyl-cyclohexane**			0.7965		$\frac{dD}{dt} = -0.000784/°C.$ (0° to 30°)
	−50.1 [78, 79]	130.26 [78]	0.7891 [18] @ 30°	1.43114 [124]	
	−57.5 [14]	130.04 [79]	0.7822 [23]	1.4333 [167]	
		128.4 to 129.5 [14]	0.786 [124]	1.43369 [79] $n^{20.30}_{H_\alpha}$	
		128.3 to 128.7 [167]	0.7868 [23]	1.43373 [79] $n^{20.30}_{H_\alpha}$	
		126.5 [124]	0.7905 [167]	1.42859 [23] $n^{20}_{H_\alpha}$	
		126.5 [23] @ 750mm	0.79620 [78]	1.43050 [23] $n^{20}_{H_\alpha}$	
			0.79625 [79]	1.43669 [79] $n^{13.78}_{H_\alpha}$	
			0.8015 [14] @ 15°	1.44133 [79] $n^{20.30}_{H_\beta}$	
			0.8016 [18] @ 15°	1.44138 [79] $n^{20.30}_{H_\beta}$	
			0.81125 [78] @ 0°	1.43635 [23] $n^{20}_{H_\beta}$	
			0.81311 [80] @ 0°	1.43823 [23] $n^{20}_{H_\beta}$	
				1.44439 [79] $n^{13.78}_{H_\beta}$	
				1.44585 [79] $n^{20.30}_{H_\gamma}$	
				1.44088 [23] $n^{20}_{H_\gamma}$	
				1.44271 [23] $n^{20}_{H_\gamma}$	
				1.44897 [79] $n^{13.78}_{H_\gamma}$	
				1.43060 [23] $n^{20}_{H_\epsilon}$	
				1.43241 [23] $n^{20}_{H_\epsilon}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
cis-1,2-Dimethyl-cyclohexane (*Continued*)					
				1.43061 [80] $n_{He_r}^{26.4}$	
				1.43387 [80] $n_{He_r}^{18.8}$	
				1.43343 [80] $n_{He_y}^{26.4}$	
				1.43598 [79] $n_{He_y}^{20.30}$	
				1.43599 [79] $n_{He_y}^{20.30}$	
				1.43663 [80] $n_{He_y}^{18.8}$	
				1.43901 [79] $n_{He_y}^{13.78}$	
				1.44211 [80] $n_{He_g}^{26.}$	
				1.44548 [80] $n_{He_g}^{18.8}$	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
trans-1,2-Dimethyl-cyclohexane			**0.776**	**1.4303**	$\frac{dD}{dt} = -0.000794/°C.$ (0° to 20°)
	−89.4 [79]	125 [111]	0.7760 [78]	1.42930 [68]	
	−89.6 [78]	124.5 [162]	0.77601 [79]	1.43020 [121]	
		124 [124]	0.779 [121]	1.43037 [124]	
		123.9 [68]	0.7798 [23]	1.4305 [71]	
		123.85 [78]	0.780 [124]	1.4326 [167]	
		123.70 [79]	0.7811 [71]	1.42466 [79] $n_{H_\alpha}^{20.35}$	
		123.42 to 124.17 [71]	0.7814 [68]	1.42470 [78] $n_{H_\alpha}^{20.35}$	
		122.5 to 123.5 [121]	0.7822 [127]	1.42778 [23] $n_{H_\alpha}^{20}$	
		121.3 to 121.5 [32]	0.7823 [167]	1.42768 [78] $n_{H_\alpha}^{13.85}$	
		126 to 126.5 [167] @ 758mm	0.7920 [32] $D_{13.4}^{13.4}$	1.43224 [79] $n_{H_\beta}^{20.35}$	
		124.5 [23] @ 755mm	0.79188 [80] @ 0°	1.43230 [78] $n_{H_\beta}^{20.35}$	
		122.5 to 124 [68] @ 748mm	0.8008 [111] @ 0°	1.43546 [23] $n_{H_\beta}^{20}$	
				1.43533 [78] $n_{H_\beta}^{13.88}$	
				1.4365 [79] $n_{H_\gamma}^{20.35}$	
				1.43673 [78] $n_{H_\gamma}^{20.35}$	
				1.44008 [23] $n_{H_\gamma}^{20}$	
				1.43979 [78] $n_{H_\gamma}^{13.88}$	
				1.42990 [23] n_{He}^{20}	
				1.42171 [80] $n_{He_r}^{26.4}$	
				1.42493 [80] $n_{He_r}^{18.8}$	

Name and Carbon Skeleton	M. P.,°C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***trans*-1,2-Dimethyl-cyclohexane** (*Continued*)				1.42443 [80] $n_{He_y}^{26.4}$ 1.42695 [79] $n_{He_y}^{20.35}$ 1.42701 [78] $n_{He_y}^{20.35}$ 1.42768 [80] $n_{He_y}^{18.8}$ 1.42999 [78] $n_{He_y}^{13.88}$ 1.43331 [80] $n_{He_0}^{26.4}$ 1.43641 [80] $n_{He_0}^{18.8}$	

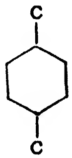
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Dimethyl-cyclohexane		128.6 to 129[17] 127.9[24,30a] 126.5[124] 126.4 to 128.9[118] 126[112] 125[111] 124.5[162] 124[106] 123 to 125[127] 122.5 to 123.5[3] 124.5[27] @ 731mm	0.780[124] 0.7874[24,30a] 0.792[118] D_{20}^{20} 0.7809[3] @ 17.85° 0.7912[24,30a] @ 15° 0.798[17] @ 15° 0.7880[27] @ 14.25° 0.7929[127] @ 11° 0.8008[112] @ 0° 0.8002[106] D_0^0	1.4266[162] 1.4292[3] 1.4314[24,30a] 1.4332[118] 1.43020[3] @ 17.85° 1.4347[127] @ 11° 1.42820[3] $n_{H_\alpha}^{17.85}$ 1.43134[27] $n_{H_\alpha}^{14.25}$ 1.43592[3] $n_{H_\beta}^{17.85}$ 1.43901[27] $n_{H_\beta}^{14.25}$ 1.44056[3] $n_{H_\gamma}^{17.85}$ 1.44342[27] $n_{H_\alpha}^{14.25}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***cis*-1,3-Dimethyl-cyclohexane**			0.783_5		$\frac{dD}{dt} = -0.0008_4$/°C. (0° to 20°)
	−86 to −90 [14] −100 [80]	124.9 [80] 123.5 [99] 121.5 [124] 121 to 122 [17] 121.0 [23] 121 [121] 119.5 to 122.3 [14]	0.7613 [18] @ 30° 0.7735 [23] 0.774 [121] 0.775 [124] 0.777 [83] 0.78348 [80] 0.7728 [14] @ 15° 0.7759 [14] @ 15° 0.7852 [18] @ 0° 0.80022 [80] @ 0°	1.42609 [124] 1.4265 [83] 1.4269 [121] 1.42385 [23] $n_{H_\alpha}^{20}$ 1.43170 [23] $n_{H_\beta}^{20}$ 1.43628 [23] $n_{H_\gamma}^{20}$ 1.42600 [23] n_{He}^{20} 1.42495 [80] $n_{He_r}^{26.4}$ 1.42835 [80] $n_{He_r}^{18.8}$ 1.42765 [80] $n_{He_y}^{26.4}$ 1.43099 [80] $n_{He_y}^{18.8}$ 1.43645 [80] $n_{He_g}^{26.4}$ 1.43972 [80] $n_{He_g}^{18.8}$	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
***trans*-1,3-Dimethyl-cyclohexane**					
	−79.4 [80]	120.59 to 121.59 [71] 120.40 [80] 119.5 [83] 119 [121] 119 [23] @ 756mm	0.762 [83] 0.76628 [80] 0.7706 [71] 0.772 [121,124] 0.78251 [80] @ 0°	1.4176 [83] 1.4254 [121] 1.4262 [71] 1.42470 [124] 1.42265 [23] $n_{H_\alpha}^{20}$ 1.43030 [23] $n_{H_\beta}^{20}$ 1.43493 [23] $n_{H_\gamma}^{20}$ 1.42480 [23] n_{He}^{20} 1.41772 [80] $n_{He_r}^{26.4}$ 1.42099 [80] $n_{He_r}^{18.8}$ 1.42047 [80] $n_{He_y}^{26.4}$ 1.42376 [80] $n_{He_y}^{18.8}$ 1.42919 [80] $n_{He_g}^{26.4}$ 1.43254 [80] $n_{He_g}^{18.8}$	

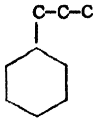
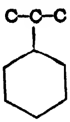
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_{4}	n^{20}_{D}	Additional Data
1,3-Dimethyl-cyclohexane		121.6 [24,30a]	0.7208 [25] @ 81°	1.4218 [161] @ 26°	
		121.3 to 121.5 [32]	0.7661 [161] @ 26°	1.4230 [1] @ 25°	
		121.2 to 121.8 [17]	0.7661 [25] @ 25.4°	1.4288 [48] @ 22.5°	
		121 to 123 [111]	0.7672 [25] @ 25.4°	1.4239 [162] @ 22°	
		121 to 121.5 [162]	0.773 [1] @ 25°	1.42398 [5] @ 22°	
		121 [112]	0.7671 [48] @ 24°	1.42499 [5] @ 20.75°	
		120.9 to 122.5 [118]	0.7701 [5] @ 21.8°	1.4234 [159]	
		120.8 [165]	0.7707 [5] @ 20.75°	1.42407 [22,68]	
		120 to 121 [167]	0.7677 [22,68]	1.4246 [165]	
		120 [50,111,159]	0.7687 [159]	1.42470 [124]	
		119 to 123 [118]	0.7697 [167]	1.425 [3]	
		119 to 120 [122,127]	0.771 [3]	1.4253 [118]	
		119 [3,124]	0.7712 [165]	1.4255 [24,30a,167]	
		118 to 120 [5]	0.772 [124]	1.4270 [50] @ 18°	
		118 [106]	0.7723 [24,30a]	1.4278 [32] @ 13.5°	
		117 to 120 [154]	0.7822 [122]	1.4298 [127] @ 11°	
		119.5 [157] @ 751mm	0.766 [154] D^{20}_{20}	1.39405 [25] $n^{81}_{H_\alpha}$	
		118.5 to 119 [1] @ 747mm	0.774 [118] D^{20}_{20}	1.42060 [25] $n^{25.4}_{H_\alpha}$	
		119.5 to 120.5 [22,68] @ 740mm	0.7688 [157] D^{19}_{0}	1.42127 [25] $n^{25.4}_{H_\alpha}$	
		119.5 to 120 [161] @ 739mm	0.7736 [50] @ 18°	1.42157 [5] $n^{22.0}_{H_\alpha}$	
			0.775 [17] @ 15°	1.42276 [5] $n^{20.75}_{H_\alpha}$	
			0.7761 [24,30a] @ 15°	1.40113 [25] $n^{81}_{H_\beta}$	
			0.7772 [48] $D^{13}_{13.6}$		

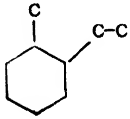
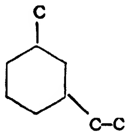
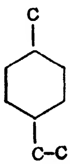
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
1,3-Dimethyl-cyclohexane (*Continued*)					
			0.7812 [127] @ 11°	1.42817 [25] $n^{25.4}_{H_\beta}$	
			0.784 [154] @ 0°	1.42887 [25] $n^{25.4}_{H_\beta}$	
			0.7874 [112] @ 0°	1.42940 [5] $n^{22.0}_{H_\beta}$	
			0.7869 [106] D_0^0	1.43047 [5] $n^{20.75}_{H_\beta}$	
				1.40528 [25] $n^{81}_{H_\gamma}$	
				1.43259 [25] $n^{25.4}_{H_\gamma}$	
				1.43338 [25] $n^{25.4}_{H_\gamma}$	
				1.43394 [5] $n^{22.0}_{H_\gamma}$	
				1.43500 [5] $n^{20.75}_{H_\gamma}$	

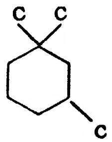
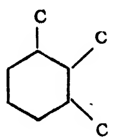
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
cis-1,4-Dimethyl-cyclohexane 	−84 to −85 [14] −91.6 [80]	124.59 [80] 123.7 [14] 123.4 [14] 121.5 to 122 [167] 121.5 [124] 120.5 [23] @ 755mm	0.7671 [23] 0.773 [124] 0.7759 [167] 0.78271 [80] 0.781 [14] @ 15° 0.795 [14] @ 15° 0.7952 [18] @ 15° 0.79925 [80] @ 0° 0.8075 [18] @ 0°	1.42300 [124] 1.4257 [167] 1.42064 [23] $n^{20}_{H_\alpha}$ 1.42833 [23] $n^{20}_{H_\beta}$ 1.43299 [23] $n^{20}_{H_\gamma}$ 1.42270 [23] n^{20}_{He} 1.42425 [80] $n^{26.4}_{He_r}$ 1.42755 [80] $n^{18.8}_{He_r}$ 1.42700 [80] $n^{26.4}_{He_y}$ 1.43029 [80] $n^{18.8}_{He_y}$ 1.43568 [80] $n^{26.4}_{He_g}$ 1.43917 [80] $n^{18.8}_{He_g}$	

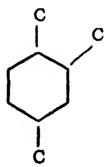
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
trans-1,4-Dimethylcyclohexane					
	−33.34 [124]	119.63 [80]	0.7620 [30] @ 22°	1.42095 [124]	
	−37.2 [80]	119.5 [124]	0.7672 [71] @ 20.5°	1.4224 [167]	
		120.07 to 120.67 [71]	0.76264 [80]	1.4248 [71]	
		120 to 121 [167]	0.7638 [23]	1.41833 [23] $n_{H_\alpha}^{20}$	
		119.0 to 119.5 [23]	0.7655 [23]	1.41914 [23] $n_{H_\alpha}^{20}$	
		119 [23]	0.7688 [167]	1.42578 [23] $n_{H_\beta}^{20}$	
		118.6 to 119 [30] @ 728mm	0.769 [124]	1.42686 [23] $n_{H_\beta}^{20}$	
			0.77913 [80] @ 0°	1.43046 [23] $n_{H_\gamma}^{20}$	
				1.43163 [23] $n_{H_\gamma}^{20}$	
				1.42000 [23] n_{He}^{20}	
				1.42120 [23] n_{He}^{20}	
				1.41566 [80] $n_{He_r}^{26.4}$	
				1.41887 [80] $n_{He_r}^{18.8}$	
				1.41827 [80] $n_{He_y}^{26.4}$	
				1.42160 [80] $n_{He_y}^{18.8}$	
				1.42697 [80] $n_{He_g}^{26.4}$	
				1.43033 [80] $n_{He_g}^{18.8}$	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,4-Dimethyl-cyclohexane					
	−32 to −33[27] −59[37]	120 to 120.2 @ 768mm[27] 122.7 to 123[17] 122.0 to 124.0[118] 121.7[24] 120.5 to 121[162] 120[112] 119.5 to 120.5[3,127] 119.5 to 120[169] 119[106] 119.5 to 120[68] @ 740mm	0.7620[27] @ 22.2° 0.7669[68] 0.7690[169] 0.7727[24,30a] 0.777[118] D_{20}^{20} 0.7722[3] @ 15.7° 0.7767[24,30a] @ 15° 0.783[17] @ 15° 0.7819[127] @ 11° 0.7866[112] @ 0° 0.7861[106] D_0^0	1.4224[162] 1.42326[68] 1.4240[3] 1.4244[169] 1.4253[24,30a] 1.4271[118] 1.42597[3] @ 15.7° 1.4299[127] @ 11° 1.41835[27] n_{H_α} 1.42407[3] n_{H_α} 1.42592[27] n_{H_β} 1.43174[3] n_{H_β} 1.43035[27] n_{H_γ} 1.43624[3] n_H	

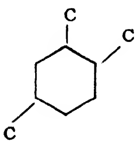
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
Propylcyclohexane		**154.7**	**0.7932**	**1.4371**	$\frac{dD}{dt} = -0.000757/°C.$ (0° to 20°)
	−94.5 [124]	155.7 [24,37] 155 [8] 154.9 to 155.0 [118] 154 to 155 [68] 153 to 154 [66,111,112,127] 140 to 142 [138] 154.5 to 155.5 [23] @ 756mm 153 to 154 [65] @ 753mm 155 to 156 [55] @ 730mm	0.791 [8] @ 21° 0.7898 [23] 0.7929 [24,30a] 0.7930 [68] 0.7946 [66] 0.7971 [65] 0.793 [118] D^{20}_{20} 0.7968 [24,30a] @ 15° 0.796 [8] @ 13° 0.8025 [127] @ 11° 0.7819 [138] @ 0° 0.8091 [112] @ 0° 0.8098 [111] @ 0°	1.437 [8] @ 21° 1.4360 [24,30a] 1.43690 [68] 1.4370 [118] 1.4374 [66] 1.4382 [65] 1.440 [8] @ 13° 1.4449 [127] @ 11° 1.43383 [23] $n^{20}_{H_\alpha}$ 1.44160 [23] $n^{20}_{H_\beta}$ 1.44616 [23] $n^{20}_{H_\gamma}$ 1.43592 [23] n^{20}_{He}	
Isopropylcyclohexane					
	−89.8 [126]	154.7 [133] 154.5 [126] 151.7 to 153.0 [118] 151 to 153 [127] 150 to 153 [75] 147 to 150 [152] 146 to 148 [112] 152 to 153 [23] @ 756mm	0.787 [152] 0.7902 [23] 0.799 [118] D^{20}_{20} 0.8090 [127] @ 11° 0.812 [112] @ 0°	1.4410 [126] 1.4411 [118] 1.4444 [127] @ 11° 1.43428 [23] $n^{20}_{H_\alpha}$ 1.44225 [23] $n^{20}_{H_\beta}$ 1.44686 [23] $n^{20}_{H_\gamma}$ 1.43642 [23] n^{20}_{He}	

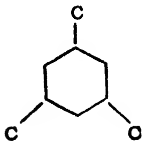
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-2-ethyl-cyclohexane 		152.6 to 154.7 [118] 151 [84] 150 to 152 [40]	0.784 [84] 0.805 [118] D_{20}^{20} 0.7945 [84] @ 0°	1.432 [84] 1.4400 [118]	
1-Methyl-3-ethyl-cyclohexane 		148.4 to 150 [118] 145 to 146 [70]	0.8213 [70] 0.791 [118] D_{20}^{20} 0.8320 [70] @ 0°	1.4311 [83] 1.4344 [118] 1.460 [70]	
***l*-1-Methyl-3-ethyl-cyclohexane**		148 to 149 [148] @ 743mm	0.7896 [148] @ 17°	1.4353 [148] @ 17°	
1-Methyl-4-ethyl-cyclohexane 		150.1 to 151 [118] 150 [112] 147 [107]	0.791 [118] D_{20}^{20} 0.7884 [107] @ 15° 0.8041 [112] @ 0°	1.4343 [118] 1.435 [107] @ 15°	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,1,3-Trimethyl-cyclohexane 		138.5 to 139 [45] 137 to 138 [3,49] 134.8 to 135 [130]	0.7866 [3] @ 25.3° 0.7663 [45] 0.7703 [45] @ 15° 0.7848 [49] @ 15°	1.43385 [3] @ 25.3° 1.4327 [45] @ 17° 1.4237 [45] @ 15° 1.4324 [49] @ 15° 1.43177 [3] $n^{20}_{H_\alpha}$ 1.43998 [3] $n^{20}_{H_\beta}$ 1.44453 [3] $n^{20}_{H_\gamma}$	
***cis*-1,2,3-Trimethyl-cyclohexane** (Hexahydrohemimellitene) 		144 to 146 [23] @ 755mm	0.7930 [23]	1.43475 [23] $n^{20}_{H_\alpha}$ 1.44259 [23] $n^{20}_{H_\beta}$ 1.44724 [23] $n^{20}_{H_\gamma}$ 1.43682 [23] $n^{20}_{H_\delta}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
trans-1,2,3-Trimethyl-cyclohexane					
(Two possible *trans* isomers)		142 to 143.5 [23] @ 762mm 141 [165] @ 736mm	0.7898 [165] 0.7914 [23]	1.4346 [165] 1.43373 [23] $n_{H_\alpha}^{20}$ 1.44150 [23] $n_{H_\beta}^{20}$ 1.44606 [23] $n_{H_\gamma}^{20}$ 1.43582 [23] n_{He}^{20}	
cis-1,2,4-Trimethyl-cyclohexane					
(Hexahydropseudocumene) 		146 [124] 144.8 to 145.8 [120] 141.5 [23,27] 33 @ 11mm [120]	0.7850 [23] 0.790 [120,124] 0.7848 [27] @ 16.7°	1.43314 [124] 1.434 [120] 1.43120 [23] $n_{H_\alpha}^{20}$ 1.43902 [23] $n_{H_\beta}^{20}$ 1.44361 [23] $n_{H_\gamma}^{20}$ 1.43341 [23] n_{He}^{20}	

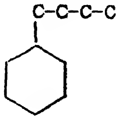
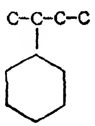
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
$1^t,2^c,4^t$-Trimethyl-cyclohexane					
		138.5 to 139.5 [23] @ 755mm	0.7813 [23]	1.42909 [23] $n_{H_\alpha}^{20}$ 1.43675 [23] $n_{H_\beta}^{20}$ 1.44135 [23] $n_{H_\gamma}^{20}$ 1.43121 [23] n_{He}^{20}	
$1^c,2^c,4^t$-Trimethyl-cyclohexane					
		142 [124]	0.786 [124]	1.43209 [124]	
$1^c,2^t,4^t$-Trimethyl-cyclohexane					
		140 [124]	0.774 [124]	1.42916 [124]	

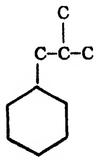
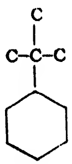
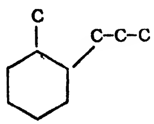
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Trimethyl-cyclohexane					
		145 to 146 [111]	0.7652 [74]	1.429 [30]	
		143 to 144 [112]	0.7667 [53]	1.4344 [32] @ 13.5°	
		142 to 144 [171]	0.778 [30]	1.43054 [27] $n^{16.7}_{H_\alpha}$	
		140 [30]	0.7808 [74]	1.42962 [27] $n^{16.6}_{H_\alpha}$	
		138 [53]	0.7807 [171] @ 18°	1.43829 [27] $n^{16.7}_{H_\beta}$	
		135 to 136 [74]	0.7850 [27] @ 16.6°	1.43733 [27] $n^{16.6}_{H_\beta}$	
		141.5 to 143 [27] @ 759mm	0.7812 [53] @ 0°	1.44281 [27] $n^{16.7}_{H_\gamma}$	
		143 to 144 [27] @ 759mm	0.8052 [112] @ 0°	1.44187 [27] $n^{16.6}_{H_\gamma}$	
1,2,5-Trimethylcyclo-hexane					
		140 to 141 [3]	0.7799 [3] @ 16.9°	1.43056 [3] @ 16.9°	
				1.42860 [3] $n^{20}_{H_\alpha}$	
				1.43632 [3] $n^{20}_{H_\beta}$	
				1.44099 [3] $n^{20}_{H_\gamma}$	

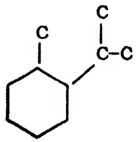
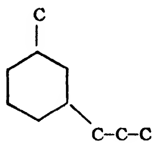
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***cis*-1,3,5-Trimethyl-cyclohexane** (Hexahydromesitylene) 		140.0 to 140.5 [23] @ 752mm 139.5 to 140.5 [23] @ 750mm	0.7765 [23] 0.7773 [23]	1.42768 [23] $n_{H_\alpha}^{20}$ 1.42808 [23] $n_{H_\alpha}^{20}$ 1.43536 [23] $n_{H_\beta}^{20}$ 1.43586 [23] $n_{H_\beta}^{20}$ 1.43990 [23] $n_{H_\gamma}^{20}$ 1.44028 [23] $n_{H_\gamma}^{20}$ 1.42990 [23] $n_{H_\epsilon}^{20}$ 1.43010 [23] $n_{H_\epsilon}^{20}$	

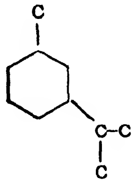
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***trans*-1,3,5-Trimethyl-cyclohexane**					
		138 to 139 [23] @ 761mm	0.7720 [23]	1.42506 [23] $n_{H_\alpha}^{20}$	
		138.5 to 139 [23] @ 754mm		1.42526 [23] $n_{H_\alpha}^{20}$	
				1.43279 [23] $n_{H_\beta}^{20}$	
				1.43288 [23] $n_{H_\beta}^{20}$	
				1.43725 [23] $n_{H_\gamma}^{20}$	
				1.43735 [23] $n_{H_\gamma}^{20}$	
				1.42710 [23] $n_{H_\epsilon}^{20}$	
				1.42740 [23] $n_{H_\epsilon}^{20}$	

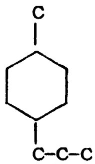
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_{4}	n^{20}_{D}	Additional Data
1,3,5-Trimethyl-cyclohexane					
		140 to 142 [111]	0.7521 [48] @ 25.5°	1.4304 [48] @ 21°	
		139.3 to 141.4 [118]	0.7590 [93]	1.4212 [93]	
		138 [53]	0.7666 [53]	1.42688 [68]	
		137.5 [3]	0.7711 [68]	1.4316 [118]	
		137 to 139 [110,112]	0.777 [118]	1.4320 [10]	
		136 to 140 [48]	D^{20}_{20} 0.7744 [27] @ 15.7°	1.42597 [3] @ 15.7°	
		136 to 137 [27]	0.7777 [3] @ 13.1°	1.42407 [3] $n^{15.7}_{H_\alpha}$	
		135 to 137 [93]	0.7784 [110, 111, 112] @ 0°	1.42683 [27] $n^{15.7}_{H_\alpha}$	
		134 to 136 [10]	0.7811 [53] @ 0°	1.43174 [3] $n^{15.7}_{H_\beta}$	
		137 to 139 [68] @ 752mm		1.43460 [27] $n^{15.7}_{H_\beta}$	
				1.43624 [3] $n^{15.7}_{H_\gamma}$	
				1.43916 [27] $n^{15.7}_{H_\gamma}$	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Butylcyclohexane		**179**	**0.7997**	**1.4412**	$\frac{dD}{dt} = -0.000858/°C.$ (10° to 20°)
	−78.6 [133]	177 to 178 [69] @ 763.5mm 180.5 [24,30a] 180.1 to 181.2 [118] 178 to 182 [21] 177 [8] 176.5 to 178.5 [127] 176 to 177 [64] @ 755mm 68 @ 16mm [8]	0.797 [8] 0.7987 [64] 0.7996 [69] 0.8005 [24,30a] 0.8178 [21] 0.799 [118] D_{20}^{20} 0.8037 [24,30a] @ 15° 0.8078 [127] @ 11° 0.8305 [21] @ 0°	1.440 [8] 1.44076 [69] 1.4408 [118] 1.4410 [24,30a] 1.4426 [64] 1.4449 [127] @ 11°	$\frac{dn}{dt} = -0.000413/°C.$ (10° to 20°)
***d*-2-Cyclohexylbutane**					$[\alpha]_D^{20} = +0.79°$ [60]
(*d-sec*-Butylcyclohexane)		176 to 178 [59] 174 [60] 63 @ 15mm [60]	0.805 [60] @ 27° 0.810 [60] @ 22° 0.815 [59] D_{20}^{20}	1.4460 [59]	$[\alpha]_D^{27} = +0.45°$ [60]
2-Cyclohexylbutane					
(*sec*-Butylcyclohexane) 		178.5 to 179.5 [118] 177.2 [133] 172 to 174.5 [127]	0.811 [118] D_{20}^{20} 0.8156 [127] @ 11°	1.4458 [118] 1.4487 [127] @ 11°	

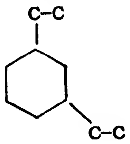
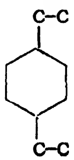
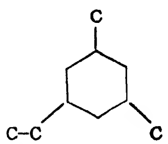
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_{4}	n^{20}_{D}	*Additional Data*
2-Methyl-1-cyclohexylpropane (*iso*-Butylcyclohexane) 		170.8 to 171.7 [118] 169 [23] @ 754mm	0.7950 [23] 0.797 [118] D^{20}_{20}	1.4391 [118] 1.43686 [23] $n^{20}_{H_\alpha}$ 1.44467 [23] $n^{20}_{H_\beta}$ 1.44920 [23] $n^{20}_{H_\gamma}$ 1.43904 [23] $n^{20}_{H_\epsilon}$	
2-Methyl-2-cyclohexylpropane (*tert*-Butylcyclohexane) 		169.9 to 171.4 [118] 167 to 169 [127] 166 to 167 [35]	0.813 [118] D^{20}_{20} 0.8305 [35] @ 16° 0.8205 [127] @ 11°	1.4464 [118] 1.45562 [35] @ 16° 1.4538 [127] @ 11°	
1-Methyl-2-propylcyclohexane 		175.2 to 177.0 [118] 171 to 172.5 [69] 175.5 to 176 [54] @ 755.5mm 56 @ 13mm [54]	0.8064 [69] 0.810 [118] D^{20}_{20} 0.8130 [54] @ 19°	1.44378 [69] 1.4445 [118] 1.4468 [54]	

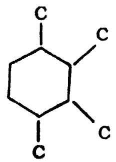
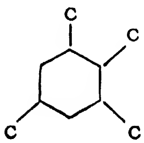
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-2-isopropyl-cyclohexane					
(*o*-Hexahydrocymene) 		171 [109]	0.8134 [109] D_0^{21} 0.8326 [109] D_0^0	1.447 [109] @ 21°	
***d*-1-Methyl-2-iso-propylcyclohexane**		169 to 170 [149] @ 752mm	0.8297 [149]	1.45649 [149]	$[\alpha]_D = +14.9°$ [149]
1-Methyl-3-propyl-cyclohexane 		171.1 to 173.0 [118] 169 to 170 [164] 164 to 165 [70]	0.7895 [164] @ 21° 0.796 [118] D_{20}^{20}	1.4352 [164] @ 21° 1.4377 [118]	

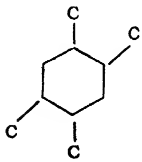
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-isopropylcyclohexane (*m*-Hexahydrocymene) 		166 to 168 [111] 166 to 167 [109] 167 to 168 [82] @ 756mm	0.7965 [109] @ 24° 0.8033 [111] @ 14°	1.440 [109] @ 24° 1.44204 [82]	
***d*-1-Methyl-3-isopropylcyclohexane**		167 to 168 [109] 168 to 168.5 [44] @ 758mm	0.7948 [44] D_0^{20} 0.8235 [109] D_0^0	1.446 [109] @ 23° 1.4380 [44]	$[\alpha]_D^{23} = +1.60°$ [109] $[\alpha]_D^{20} = +0.45°$ [44]
***l*-1-Methyl-3-isopropylcyclohexane**		167.5 to 168 [47] @ 749mm	0.7938 [47] D_0^{20} 0.8078 [47] D_0^0	1.4358 [47]	$[\alpha]_D^{20} = -0.28°$ [47]

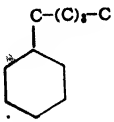
Name and Carbon Skeleton	M. P.,°C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-propyl-cyclohexane					
		168 to 169 [69] @ 765mm 174.3 to 177.1 [118]	0.7941 [69] 0.798 [118] D_{20}^{20}	1.43884 [69] 1.4393 [118]	
***cis*-1-Methyl-4-iso-propylcyclohexane**					
(*p*-Hexahydrocymene)		168.5 [124]	0.816 [124]	1.45149 [124]	
					
***trans*-1-Methyl-4-iso-propylcyclohexane**					
		161.0 [124]	0.792 [124]	1.43931 [124]	

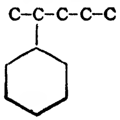
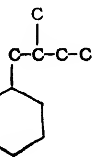
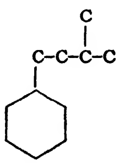
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-isopropyl-cyclohexane		171 to 172 [96] 171 [25] 170 to 172 [125] 170 [82] 169 to 171 [53] 169 to 170.5 [7] 169 to 170 [112] 169 [141] 168 to 170 [113] 168 to 169 [146] 167 to 168 [109] 166 to 168 [111] 165 to 169 [55] 171 [46] @ 759mm 169 [91] @ 758mm 169.5 to 170 [53] @ 754mm 169 [153] @ 752mm 169 [149] @ 747mm 166 to 168 [22,68] @ 746mm 63 @ 22mm [1]	0.7448 [25] @ 79.2° 0.8061 [1] @ 25° 0.8020 [109] D_0^{25} 0.7904 [25] @ 20.1° 0.790 [53] 0.7930 [53] 0.7960 [22,68] 0.7963 [46] 0.7974 [125] 0.7990 [96] 0.8039 [149] 0.7904 [25] @ 19.9° 0.8060 [82] @ 17.5° 0.796 [7] D_{15}^{15} 0.803 [141] D_{15}^{15} 0.8056 [53] @ 0° 0.8132 [112] @ 0° 0.8179 [82] @ 0° 0.8066 [146] D_0^0 0.8067 [7] D_0^0 0.8134 [109] D_0^0	1.4370 [1] @ 25° 1.440 [109] @ 25° 1.4375 [46] 1.43757 [53] 1.4380 [125] 1.43840 [22,68] 1.4385 [96] 1.44187 [149] 1.40789 [25] $n_{H_\alpha}^{79.2}$ 1.43418 [25] $n_{H_\alpha}^{20.1}$ 1.43458 [25] $n_{H_\alpha}^{19.9}$ 1.41521 [25] $n_{H_\beta}^{79.2}$ 1.44196 [25] $n_{H_\beta}^{20.1}$ 1.44234 [25] $n_{H_\beta}^{19.9}$ 1.41954 [25] $n_{H_\gamma}^{79.2}$ 1.44651 [25] $n_{H_\gamma}^{20.1}$ 1.44694 [25] $n_{H_\gamma}^{19.9}$	

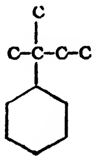
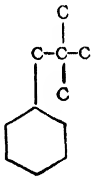
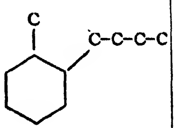
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D^{20}_{4}	n^{20}_{D}	*Additional Data*
1,3-Diethylcyclohexane 		173.5 to 174.5 [118] 169 to 173 [127] 169 to 171 [172]	0.7957 [172] @ 22° 0.800 [118] D^{20}_{20} 0.8118 [127] @ 11°	1.4388 [172] 1.4409 [118] 1.4449 [127] @ 11°	
1,4-Diethylcyclohexane 		174.6 to 176.4 [118]	0.802 [118] D^{20}_{20}	1.4415 [118]	
1,3-Dimethyl-5-ethyl-cyclohexane 		168.5 to 170 [129] 168 to 170 [100]	0.7929 [129] D^{20}_{0} 0.796 [100] D^{15}_{15} 0.8073 [129] D^{0}_{0} 0.8076 [100] D^{0}_{0}		

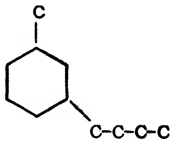
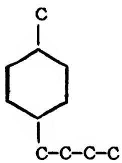
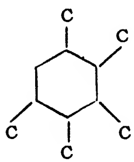
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
1,2,3,4-Tetramethylcyclohexane (Hexahydroprehnitene) 		84 @ 5mm [81]	0.8219 [81]	1.4531 [81]	
***cis*-1,2,3,5-Tetramethylcyclohexane** (Hexahydroisodurene) 		168 to 170 [23] @ 762mm	0.8166 [23]	1.44621 [23] $n^{20}_{H_\alpha}$ 1.45472 [23] $n^{20}_{H_\beta}$ 1.45963 [23] $n^{20}_{H_\gamma}$ 1.44847 [23] n^{20}_{He}	
***trans*-1,2,3,5-Tetramethylcyclohexane** (Several possible *trans* isomers)		162 to 164 [23] @ 765mm	0.8140 [23]	1.44440 [23] $n^{20}_{H_\alpha}$ 1.45212 [23] $n^{20}_{H_\beta}$ 1.45667 [23] $n^{20}_{H_\gamma}$ 1.44657 [23] n^{20}_{He}	

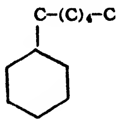
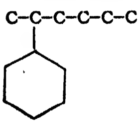
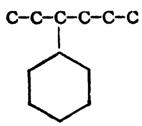
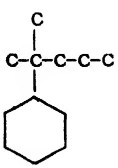
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***cis*-1,2,4,5-Tetra-methylcyclohexane** (Hexahydrodurene) 		171 [23] @ 755mm	0.8122 [23]	1.44420 [23] $n_{H_\alpha}^{20}$ 1.45252 [23] $n_{H_\beta}^{20}$ 1.45756 [23] $n_{H_\gamma}^{20}$ 1.44647 [23] $n_{H_\epsilon}^{20}$	
***trans*-1,2,4,5-Tetra-methylcyclohexane** (Several possible *trans* isomers)		166 to 168 [23]	0.8100 [23]	1.44230 [23] $n_{H_\alpha}^{20}$ 1.45003 [23] $n_{H_\beta}^{20}$ 1.45470 [23] $n_{H_\gamma}^{20}$ 1.44446 [23] $n_{H_\epsilon}^{20}$	

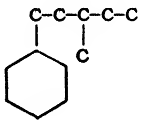
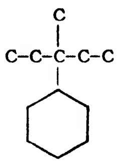
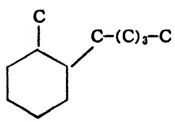
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2,4,5-Tetramethyl-cyclohexane		160.5 to 161.5 [3] 160 to 161.5 [22,68] @ 755mm 172 to 174 [92] @ 730mm 169 to 170.5 [151] @ 711mm	0.7578 [22,68] @ 70° 0.7765 [92] @ 23° 0.7934 [22] 0.811 [151] 0.7910 [3] @ 13.1° 0.825 [151] @ 0°	1.4299 [22,68] @ 40° 1.4196 [92] @ 23° 1.43717 [22,68] 1.44511 [151] 1.43718 [3] @ 13.1° 1.44260 [151] $n_{H_\alpha}^{20}$ 1.43517 [3] $n_{H_\alpha}^{13.1}$ 1.45064 [151] $n_{H_\beta}^{20}$ 1.44307 [3] $n_{H_\beta}^{13.1}$ 1.45524 [151] $n_{H_\gamma}^{20}$ 1.44772 [3] $n_{H_\gamma}^{13.1}$	
$C_{11}H_{22}$ **Pentylcyclohexane** 		201.4 to 201.9 [118] 199 [8] 194.5 to 198 [127] 191 to 192 [35] 197 to 199 [69] @ 754mm 84 to 85 [8] @ 16mm	0.802 [8] 0.8044 [69] 0.804 [118] D_{20}^{20} 0.823 [35] @ 16° 0.8160 [127] @ 11°	1.4428 [118] 1.444 [8] 1.44428 [69] 1.454 [35] @ 16° 1.4466 [127] @ 11°	

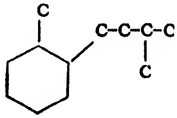
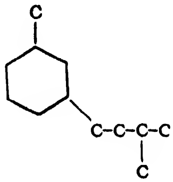
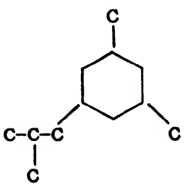
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
l-2-Cyclohexylpentane 		101 [60] @ 18mm 88 [60] @ 15mm	0.814 [60] @ 27° 0.823 [60] @ 25°		$[\alpha]_D^{27} = -0.81°$ [60]
***d*-2-Methyl-1-cyclohexylbutane** (*d*-[2-Methylbutyl]-cyclohexane) 		191 [61]	0.805 [61] @ 25°		$[\alpha]_D^{25} = +3.04°$ [61]
3-Methyl-1-cyclohexylbutane 		192.5 to 193 [69] @ 774mm 193.8 to 195.2 [118] 190 to 194 [127] 190 to 191 [86]	0.8023 [69] 0.8235 [88] 0.800 [118] D_{20}^{20} 0.8136 [127] @ 11°	1.4420 [118] 1.44233 [69] 1.58125 [86] 1.4477 [127] @ 11°	

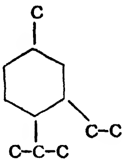
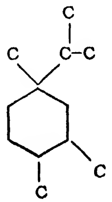
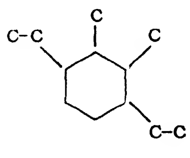
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C* @ 760mm	D^{20}_{4}	n^{20}_{D}	*Additional Data*
2-Methyl-2-cyclohexylbutane 		193.3 to 195.2 [118] 191 to 192 [35]	0.821 [118] D^{20}_{20} 0.8226 [35] @ 16°	1.4510 [118] 1.4538 [35,118] @ 16°	
2,2-Dimethyl-1-cyclohexylpropane 			0.78352 [94] @ 40° 0.79893 [94]	1.4416 [94] 1.4502 [94] @ 0° 1.4631 [94] @ −30°	$\frac{dD}{dt} = -0.0007_7$/°C. (20° to 40°) $\frac{dn}{dt} = -0.00043$/°C. (−30° to +20°
1-Methyl-2-butylcyclohexane 		195.6 to 198.1 [118]	0.813 [118] D^{20}_{20}	1.4467 [118]	

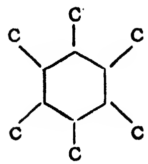
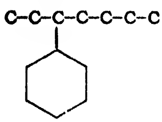
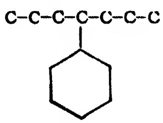
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_{4}	n^{20}_{D}	*Additional Data*
1-Methyl-3-butyl-cyclohexane 		194.8 to 195.2 [118]	0.801 [118] D^{20}_{20}	1.4418 [118]	
1-Methyl-4-butyl-cyclohexane 		195.9 to 196.6 [118]	0.807 [118] D^{20}_{20}	1.4441 [118]	
Pentamethyl-cyclohexane 		180 to 185 [127] 183 to 186 [68] @ 752mm	0.7990 [68] @ 50° 0.8200 [68] 0.8081 [127] @ 11°	1.43848 [68] @ 50° 1.44995 [68] 1.4455 [127] @ 11°	

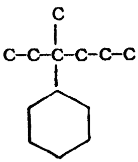
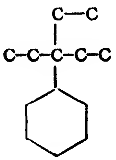
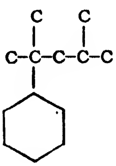
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Hexylcyclohexane 		221 [8] 219 to 221 [86] 102 [8] @ 16mm	0.8239 [86] 0.806 [8]	1.446 [8] 1.45222 [86]	
***l*-2-Cyclohexylhexane** 		101 [60] @ 18mm	0.823 [60] @ 25°		$[\alpha]_D^{25} = -0.90°$ [60]
***d*-3-Cyclohexylhexane** 		111 [60] @ 28mm	0.823 [60] @ 23°		$[\alpha]_D^{23} = +0.57°$ [60]
2-Methyl-2-cyclohexylpentane 		206 to 207 [35]	0.8372 [35] @ 16°	1.4670 [35] @ 16°	

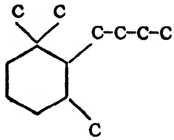
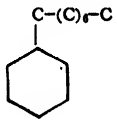
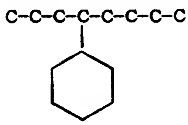
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
l-3-Methyl-1-cyclohexylpentane 		110 [62] @ 15mm	0.806 [62] @ 27°		$[\alpha]_D^{27} = -1.68°$ [62]
3-Methyl-3-cyclohexylpentane 		207 to 208 [35]	0.8310 [35] @ 16°	1.4574 [35] @ 16°	
1-Methyl-2-pentylcyclohexane 		215.8 to 219.1 [118]	0.816 [118] D_{20}^{20}	1.4487 [118]	

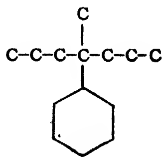
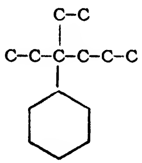
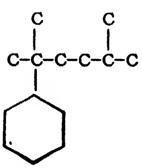
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-2-(3-methylbutyl)-cyclohexane 		204 [84]	0.812 [84] @ 17° 0.825 [84] @ 0°	1.454 [84] @ 17°	
1-Methyl-3-(3-methylbutyl)-cyclohexane 		205 [70]			
1,3-Dimethyl-5-(2-methylpropyl)-cyclohexane 		193 to 195 [110]	0.8227 [110] @ 0°		

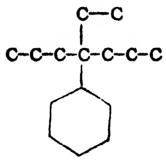
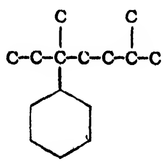
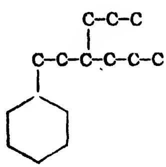
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-3-ethyl-4-isopropylcyclohexane 		207 to 208 [56] @ 736mm	0.8159 [56] 0.8275 [56] @ 0°		$[\alpha]_D = -12.25°$ [56]
1,3,4-Trimethyl-1-isopropylcyclohexane 		177 [28]	0.8375 [28]	1.4636 [28]	
1,2-Dimethyl-3,6-diethylcyclohexane 		91 to 92 [81] @ 4mm	0.8536 [81]	1.4673 [81]	

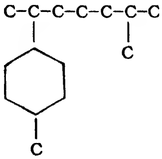
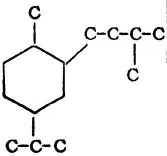
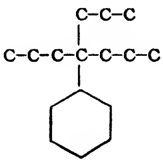
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
Hexamethylcyclohexane (Hexahydromellitene) 		210 to 214 [22,68]	0.8405 [22,68]	1.4606 [22,68]	
$C_{13}H_{26}$ **l-3-Cyclohexylheptane** 		112 [60] @ 15mm	0.819 [60] @ 25°		$[\alpha]_D^{25} = -0.68°$
4-Cyclohexylheptane 		228 [2,108]			

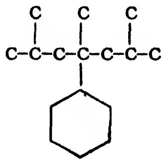
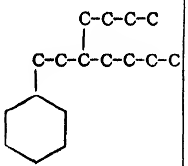
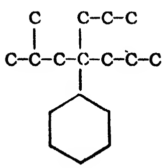
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Methyl-3-cyclohexylhexane 		224 to 226 [35]	0.8406 [35] @ 16°	1.4646 [35] @ 16°	
3-Ethyl-3-cyclohexylpentane 		222 to 223 [35]	0.8388 [35] @ 16°	1.4658 [35] @ 16°	
2,4-Dimethyl-2-cyclohexylpentane 		220 to 221 [35]	0.8304 [35] @ 16°	1.4580 [35] @ 16°	

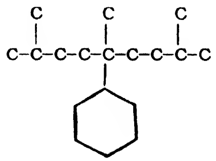
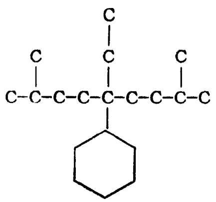
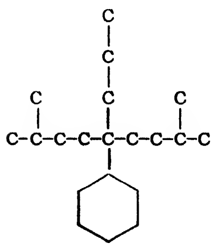
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,3-Trimethyl-2-butylcyclohexane 		94 to 95 [101] @ 10mm	0.8292 [101] @ 19°	1.4563 [101] @ 19°	
$C_{14}H_{28}$ **Octylcyclohexane** 		117 to 119 [69] @ 11mm	0.8150 [69]	1.45070 [69]	
***l*-4-Cyclohexyloctane** 		123 [60] @ 15mm	0.823 [60] @ 27°		

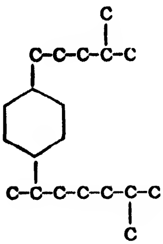
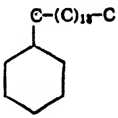
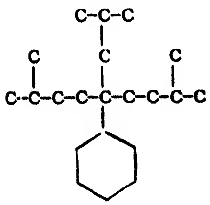
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Methyl-4-cyclohexylheptane 		115 to 116 [35] @ 13mm	0.8483 [35] @ 19°	1.4717 [35] @ 19°	
3-Ethyl-3-cyclohexylhexane 		114 to 116 [35] @ 13mm	0.8547 [35] @ 19°	1.4754 [35] @ 23°	
2,5-Dimethyl-2-cyclohexylhexane 		134 to 135 [35] @ 30mm	0.8512 [35] @ 19°	1.4685 [35] @ 23°	

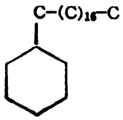
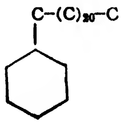
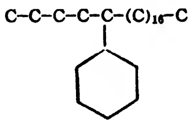
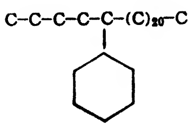
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
4-Ethyl-4-cyclohexyl-heptane 		129 to 130 [35] @ 13mm	0.8376 [35] @ 19°	1.4598 [35] @ 23°	
3,6-Dimethyl-3-cyclo-hexylheptane 		120 to 121 [35] @ 10mm	0.8717 [35] @ 19°	1.4871 [35] @ 23°	
3-Propyl-1-cyclohexyl-hexane 		83 to 85 [87] @ 2mm	0.8285 [87]	1.4550 [87]	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
6-Methyl-2-[4-methyl-cyclohexyl]-heptane					$[\alpha]_D^{20} = -10.2°$ [114]
(Hexahydrozingiberene) 		125 [103] @ 15mm 128 to 130 [114] @ 11mm 123 to 125 [117] @ 8mm	0.8244 [117] 0.8264 [114] 0.829 [104] 0.828 [103] @ 15°	1.45423 [117] 1.4560 [114] 1.4567 [104]	
1-Methyl-4-isopropyl-2-(3-methylbutyl)-cyclohexane 		131 to 133 [116] @ 14mm	0.8250 [116] @ 22°	1.45562 [116] @ 22°	
$C_{16}H_{32}$					
4-Propyl-4-cyclohexyl-heptane 		133 to 135 [35] @ 11mm	0.8382 [35] @ 19°	1.4606 [35] @ 23°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,4,6-Trimethyl-4-cyclohexylheptane 		133 to 135 [35] @ 11mm	0.8396 [35] @ 19°	1.4622 [35] @ 23°	
$C_{17}H_{34}$					
3-Butyl-1-cyclohexyl-heptane 		95 to 96 [87] @ 2mm	0.8351 [87]	1.4648 [87]	
2-Methyl-4-propyl-4-cyclohexylheptane 		148 to 150 [35] @ 10mm	0.8441 [35] @ 19°	1.4658 [35] @ 23°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,5,8-Trimethyl-5-cyclohexylnonane 		156 to 158 [29] @ 12mm	0.8440 [35] @ 20.5°	1.4666 [35]	
$C_{19}H_{38}$ **2,8-Dimethyl-5-ethyl-5-cyclohexylnonane** 		162 to 164 [35] @ 10mm	0.8681 [35] @ 20.5°	1.4789 [35]	
$C_{20}H_{40}$ **2,8-Dimethyl-5-propyl-5-cyclohexylnonane** 		190 to 192 [35] @ 17mm	0.8421 [35] @ 20.5°	1.4646 [35]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-(4-Methylpentyl)-4-(1,5-dimethylhexyl)-cyclohexane 		183 to 186 [115] @ 14mm	0.8331 [115]	1.46001 [115]	
$C_{21}H_{42}$ **Pentadecylcyclohexane** 	25 [34]	178 [34] @ 0.7mm	0.8323 [34] @ 19.5°	1.4612 [34]	
2,8-Dimethyl-5-isobutyl-5-cyclohexylnonane 		162 to 163 [35] @ 6mm	0.8797 [35] @ 20.5°	1.4905 [35]	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Octadecylcyclohexane 	41.20 to 41.45 [128] 40 [76,77] 35 [139]	207.5 to 208.5 [128] @ 3mm	0.834 [76] @ 25°	1.4538 [76] @ 25°	
$C_{28}H_{56}$ Cyclohexyldocosane 	49 to 50 [76]		0.8327 [76] @ 25°	1.4643 [76] @ 25°	
5-Cyclohexyldocosane 			0.8395 [76] @ 25°	1.4627 [76] @ 25°	
$C_{32}H_{64}$ 5-Cyclohexylhexa-cosane 	30 to 31 [76]		0.8372 [76] @ 25°	1.4677 [76] @ 25°	

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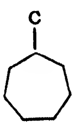
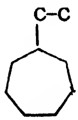
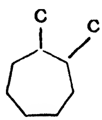
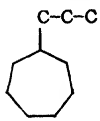
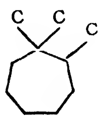
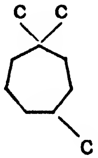
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cycloheptane			**0.8100**	**1.4436_6**	$\frac{dD}{dt} = -0.000897_6$/°C. (0° to 60°)
	−13 [10] −12 to −13 [12]	117 to 117.5 [4] @ 763mm 119 to 120 [2] 118 to 120 [7] 117 to 117.3 [5] 117.5 to 118 [11] @ 758mm 116 to 118 [9] @ 730mm 118 [12] @ 726mm	0.7733 [11] @ 61.0° 0.7905 [11] @ 41.0° 0.8079 [9] @ 24° 0.8118 [8] 0.811 [10] 0.8108 [12] 0.8099 [7] 0.8098 [11] 0.8093 [4] D_0^{20} 0.816 [4] D_{15}^{15} 0.8136 [1,2] $D_{13.5}^{13.5}$ 0.8275 [12] @ 0° 0.8253 [4] D_c^0	1.4419 [9] @ 24° 1.44521 [12] 1.4440 [7,8] 1.44355 [11] 1.4466 [1,2] @ 13.5° 1.44090 [11] $n_{H_\alpha}^{20}$ 1.44906 [11] $n_{H_\beta}^{20}$ 1.45288 [11] $n_{H_\gamma}^{20}$	$\frac{dn}{dt} = -0.000444_0$/°C. (10° to 25°)
C_8H_{16} **Methylcycloheptane**		**134**		**1.4403**	$\frac{dn}{dt} = -0.00047$/°C. (10° to 20°)
		135 to 136 [1] @ 767mm 134 [13] 133 to 135 [9]	0.8052 [9] 0.7981 [13] @ 18° 0.8087 [1,2] $D_{13.5}^{13.5}$	1.4410 [9] 1.4382 [13] 1.4390 [13] @ 18° 1.4436 [2] @ 13.5°	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Ethylcycloheptane 		163 to 163.5 [6] @ 740mm	0.8152 [6] D_0^{20} 0.8299 [6] D_0^0		
1,2-Dimethylcycloheptane 		153 [3]			
$C_{10}H_{20}$ **Propylcycloheptane** 		183 to 184 [14] @ 756mm	0.8175 [14] @ 18°	1.4502 [14] @ 18°	
1,1,2-Trimethylcycloheptane 		104 to 105 [9] @ 100mm	0.8243 [9]	1.4527 [9]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,4-Trimethylcycloheptane 		162 to 163 [9] @ 720mm	0.8011 [9]	1.4420 [9]	

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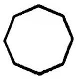
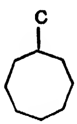
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cycloöctane			**0.8304$_7$**	**1.4563**	$\frac{dD}{dt} = -0.000869_3$/°C. (10° to 80°)
	14.2 to 14.4 [19] 14 [20] 13 to 14 [22] 11.5 [18] 9.5 to 11.5 [1]	145.3 to 146.3 [16] 146.5 [1] @ 752mm 148.5 to 149.5 [22] @ 749mm 144 [7] @ 730mm 147 to 148 [20] @ 720mm 145.3 to 148 [18] @ 720mm 149.6 to 150.6 [19] @ 709mm 39 to 42 [17] @ 15mm	0.7800 [7] @ 78.3° 0.7800 [14] @ 78° 0.7947 [8] @ 61.2° 0.8296 [7] 0.830 [14] 0.833 [2,18] 0.8349 [22] 0.835 [16] 0.839 [19] 0.841 [20] 0.8318 [8] @ 17° 0.8332 [7] @ 15.8° 0.8396 [1,3] $D_{13.5}^{13.5}$ 0.850 [18] @ 0° 0.855 [20] @ 0°	1.4558 [7] 1.45777 [16] 1.4586 [19,22] 1.4610 [1,3] @ 13.5° 1.4641 [14] $n_{He_c}^{16}$ 1.4573 [14] $n_{He_f}^{16}$ 1.4662 [14] $n_{He_i}^{16}$ 1.4545 [14] $n_{He_r}^{16}$	
C_9H_{18} **Methylcycloöctane**					
	14 to 16 [1]	160 to 163 [1] @ 750mm 148.5 [22] @ 749mm	0.8349 [1] 0.8405 [1] $D_{13.5}^{13.5}$	1.4567 [3] @ 13.5°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclononane					
		170 to 172 [21]	0.7733 [21] @ 16° 0.785 [21] @ 0°	1.4328 [21] @ 16°	
$C_{10}H_{20}$ Cyclodecane					
	9.6 [4,15]	201 [4] 82 @ 16mm [4]	0.8577 [4] @ 20.4° 0.8584 [4] @ 19.6°	1.46922 [4] $n_{H_\alpha}^{20}$ 1.47758 [4] $n_{H_\beta}^{20}$ 1.48242 [4] $n_{H_\gamma}^{20}$ 1.47181 [4] $n_{He}^{19.6}$	
$C_{11}H_{22}$ Cycloundecane					
		183.5 to 184.5 @ 764.5mm [5] 179 to 181 [6]	0.81284 [5] 0.8002 [6] @ 14° 0.8119 [6] @ 0°	1.44834 [5]	
$C_{12}H_{24}$ Cyclododecane					$\frac{dD}{dt} = -0.00070$/°C. (55° to 75°)
	61 [14]	118 [14] @ 18mm	0.8223 [14] @ 75° 0.8340 [14] @ 58°		

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclotridecane					$\frac{dD}{dt} = -0.0007/°C.$ (15° to 35°)
	18 [14]	112 to 113 [14] @ 9mm	0.8513 [14] @ 33.5° 0.8608 [14] 0.8636 [14] @ 16°		
$C_{14}H_{28}$ **Cyclotetradecane**					
	53 [14]	143 [14] @ 16mm	0.8259 [14] @ 79° 0.8284 [14] @ 75°	1.4515 [14] @ 80° 1.4533 [14] $n_{He_e}^{75}$ 1.4506 [14] $n_{He_r}^{75}$ 1.4623 [14] $n_{He_i}^{75}$	
$C_{15}H_{30}$ **Cyclopentadecane**					$\frac{dD}{dt} = -0.0006_2/°C.$ (75° to 110°)
	61 [14]		0.8048 [14] @ 109° 0.8240 [14] @ 78° 0.828 [14] @ 71°	1.4522 [14] @ 80° 1.4448 [14] $n_{He_f}^{101}$ 1.4554 [14] $n_{He_f}^{71}$ 1.4528 [14] $n_{He_r}^{71}$ 1.4644 [14] $n_{He_i}^{71}$	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
Methylcyclopentadecane			**0.8585_1**		$\frac{dD}{dt} = -0.0006200$ $(1-0.000499t)$/°C. (20° to 80°)
	− 19 [14]	147 to 148 [11] @ 12mm	0.8051 [14] @ 109° 0.8227 [8] @ 79.2° 0.8337 [8] @ 60.9° 0.8475 [8] @ 34.5° 0.8576 [11] @ 21° 0.8593 [8] @ 20.3° 0.858 [14] 0.8594 [14] @ 19°	1.4735 [14] @ 21° 1.4438 [14] $n_{He_f}^{102}$ 1.4716 [14] $n_{He_f}^{18}$ 1.4837 [14] $n_{He_i}^{18}$	
Cyclohexadecane					
	57 [14] 61 [9]	170 to 171 [14] @ 20mm	0.819 [14] @ 79° 0.824 [14] @ 72°	1.4529 [14] @ 80° 1.4557 [14] @ 72°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cycloheptadecane	65 [14]		0.8021 [14] @ 108° 0.8062 [14] @ 101° 0.8200 [14] @ 77°	1.4507 [14] @ 80° 1.4436 [14] $n_{He_f}^{101}$ 1.4409 [14] $n_{He_r}^{101}$ 1.4524 [14] $n_{He_i}^{101}$	$\frac{dD}{dt} = -0.00058/°C.$ (75° to 110°)
$C_{18}H_{36}$ **Cyclooöctadecane**	72 [9,14]		0.7998 [14] @ 111° 0.8201 [14] @ 76°	1.4506 [14] @ 80° 1.4427 [14] $n_{He_f}^{104}$ 1.4533 [14] $n_{He_f}^{72}$ 1.4399 [14] $n_{He_r}^{104}$ 1.4506 [14] $n_{He_r}^{72}$ 1.4514 [14] $n_{He_i}^{104}$ 1.4624 [14] $n_{He_i}^{72}$	$\frac{dD}{dt} = -0.0006/°C.$ (75° to 110°)

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclodocosane					
	46 [14]	212 [14] @ 16mm	0.8174 [14] @ 75°	1.4481 [14] @ 80° 1.4499 [14] $n_{He_f}^{75}$ 1.4472 [14] $n_{He_r}^{75}$ 1.4589 [14] $n_{He_s}^{75}$	
$C_{23}H_{46}$ Cyclotricosane			**0.8280$_0$ @ 60°**		$\frac{dD}{dt} = -0.0002870 (1+0.0128_3t)$/°C. (55° to 110°)
	49 to 50 [13] 56 [14]	177 [13] @ 0.4mm	0.7973 [14] @ 111° 0.8233 [14] @ 69° 0.8259 [13] @ 64° 0.8305 [13] @ 55°	1.4558 [13] @ 56°	
$C_{24}H_{48}$ Cyclotetracosane					
	47 [14]	222 to 228 [14] @ 0.6mm			

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclohexacosane			**0.8238 @ 60°**		$\frac{dD}{dt} = -0.000609_1$/°C. (60° to 115°)
	41 to 42 [10] 42 [14]	218 to 219 [14] @ 0.5mm	0.7924 [14] @ 112° 0.8120 [14] @ 78° 0.8255 [10] @ 58°	1.4484 [14] @ 80° 1.4463 [14] $n_{He_r}^{78}$ 1.4491 [12] $n_{He_y}^{78}$ 1.4536 [12] $n_{He_g}^{78}$ 1.4558 [14] $n_{He_c}^{78}$ 1.4580 [14] $n_{He_i}^{78}$	
$C_{28}H_{56}$ **Cycloöctacosane**					
	47 to 48 [10] 48 [14]	213 to 214 [14] @ 0.25mm	0.8103 [14] @ 80° 0.813 [14] @ 76° 0.8243 [10] @ 58°	1.4489 [14] @ 80°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclononacosane					$\frac{dD}{dt} = -0.0006_4$/°C. (35° to 65°)
	47 [14]		0.8232 [14] @ 64° 0.8429 [14] @ 33°		
$C_{30}H_{60}$ **Cyclotriacontane**			0.8294 @ 60°		$\frac{dD}{dt} = -0.00063$/°C. (60° to 110°)
	53 to 54 [9] 56 [14] 57.8 [10]	230 [10] @ 0.2mm	0.7973 [14] @ 111° 0.8180 [14] @ 77° 0.8219 [10] @ 73° 0.8233 [14] @ 69° 0.8308 [14] @ 58°	1.4401 [10] @ 114° 1.4523 [14] @ 80° 1.4555 [10] @ 71°	
$C_{32}H_{64}$ **1,16-Dimethylcyclo-triacontane**					
	52 [7]		0.808 [7] @ 89.3° 0.813 [7] @ 80°	1.4498 [7] @ 80°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclodotriacontane					
	59 to 60 [10]		0.8261 [10] @ 70°	1.4568 [10] @ 70° 1.4590 [10] @ 63°	
$C_{34}H_{68}$ **Cyclotetratriacontane**					$\frac{dn}{dt} = -0.00033_7$/°C. (75° to 150°)
	66 to 67 [10]	230 to 240 [10] @ 0.3mm	0.8229 [10] @ 76°	1.4302 [10] @ 151° 1.4443 [10] @ 107° 1.4568 [10] @ 72°	

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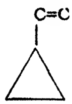
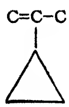
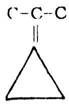
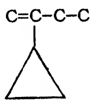
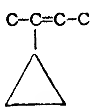
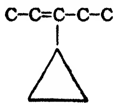
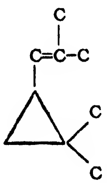
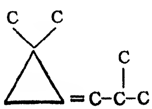
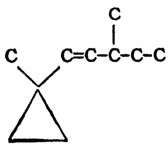
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Ethylidenecyclopropane					$\frac{dD}{dt} = -0.001_0/°C.$ (0° to 20°)
		37.5 [5] @ 750mm	0.7052 [5] @ 18° 0.7235 [5] @ 0°	1.40255 [5] @ 18°	
Cyclopropylethylene			**0.721**		$\frac{dD}{dt} = -0.001_0/°C.$ (0° to 20°)
(Ethenylcyclopropane) 		40 to 40.2 [4] @ 755mm	0.723 [4] @ 18° 0.726 [4] @ 15° 0.7311 [4] @ 10° 0.7415 [4] @ 0°	1.4172 [4] @ 15° 1.4205 [4] @ 10°	
C_6H_{10} **2-Cyclopropylpropene-1**					
(Isopropenylcyclopropane) 		71.1 to 71.5 [10] @ 772mm 69.5 to 70.0 [7] @ 751mm	0.74999 [7] 0.7510 [10]	1.4252 [10] 1.42524 [7] 1.42064 [7] $n_{H_\alpha}^{20}$ 1.43206 [7] $n_{H_\beta}^{20}$	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
Isopropylidenecyclopropane					
(2-Cyclopropylidenepropane) 		70.5 to 71 [1] @ 763mm 71 to 71.5 [12] @ 718mm	0.7531 [1]	1.424 [1] 1.4264 [12] @ 17°	
C_7H_{12} **2-Cyclopropylbutene-1**					
		103.5 to 103.8 [7]	0.7772 [7]	1.43901 [7] 1.43569 [7] $n^{20}_{H_\alpha}$ 1.44926 [7] $n^{20}_{H_\beta}$ 1.45515 [7] $n^{20}_{H_\gamma}$	
2-Cyclopropylbutene-2					
(1-Methylpropen-1-ylcyclopropane) 		105.5 to 106 [7]	0.7804 [7]	1.44253 [7] 1.43861 [7] $n^{20}_{H_\alpha}$ 1.44926 [7] $n^{20}_{H_\beta}$ 1.45515 [7] $n^{20}_{H_\gamma}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Cyclopropylpentene-2				**1.447**	
		127.5 to 128 [7] @ 762.5mm 129 to 130 [2]	0.79150 [7] 0.7644 [2]	**1.44454** [7] **1.45841** [2] 1.44159 [7] $n_{H_\alpha}^{20}$ 1.45156 [7] $n_{H_\beta}^{20}$	
C_9H_{16} **2,2-Dimethyl-1-(2-methylpropen-1-yl)-cyclopropane**					
		132 [8] @ 758mm	0.7677 [8] 0.7681 [8] D_0^{20}	1.4420 [8]	
1,1-Dimethyl-2-(2-methylpropylidene)-cyclopropane					
	−18 [6]	112 [11]			

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-1-(3-methyl-penten-1-yl)-cyclopropane 		162 to 162.7 [9] 160 to 160.5 [9] @ 735mm			

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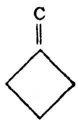
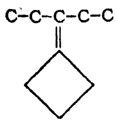
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Methylenecyclobutane			0.738_6		$\frac{dD}{dt} = -0.00099$/°C. (0° to 25°)
		42 [3] 42 [4] @ 749mm 40.6 to 41.6 [1,2] @ 732mm	0.7360 [3] @ 23° 0.7425 [1,2] @ 15° 0.7487 [1] @ 10° 0.7583 [2] @ 0° 0.7585 [1] @ 0°	1.42353 [1,2] @ 15° 1.42626 [1,2] @ 10°	
C_9H_{16} **3-Cyclobutylidene-pentane**					
			0.8091 [5]	1.4510 [5]	

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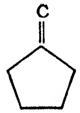
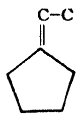
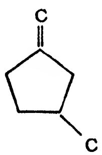
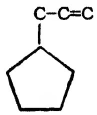
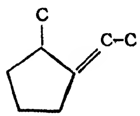
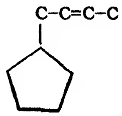
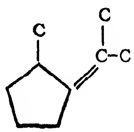
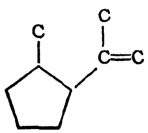
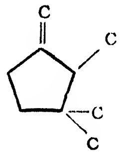
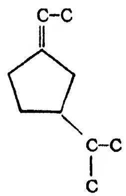
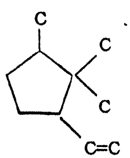
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Methylenecyclo-pentane			**0.778_7**		$\frac{dD}{dt} = -0.0010_8$/°C. (20° to 45°)
		77 to 79 [8] @ 767mm 78 to 81 [9] 75 to 76 [8a] 76 to 78 [8]	0.7518 [8a] @ 44.8° 0.7541 [8a] @ 42.7° 0.7778 [8a] @ 20.8° 0.7770 [8] 0.7787 [8,8a] 0.778 [a]	1.4350 [8] 1.43078 [8a] 1.4320 [8] 1.4351 [a] 1.4355 [9] @ 19° 1.42808 [8a] $n_{H_\alpha}^{20}$ 1.43743 [8a] $n_{H_\beta}^{20}$ 1.44257 [8a] $n_{H_\gamma}^{20}$	
C_7H_{12} **Ethylidenecyclo-pentane**					
		113 to 117 [12]	0.8020 [12]	1.4481 [12]	
1-Methylene-3-methyl-cyclopentane					
		96 to 97 [7,13] 93.5 [14]	0.7734 [14] @ 19° 0.7750 [7,13] @ 16°	1.4296 [14] @ 19° 1.4336 [13] @ 16°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Isopropylidenecyclopentane 		136 to 137 [11]	0.817 [11]	1.4581 [11]	
1-Cyclopentylpropene-2 (Allylcyclopentane) 		124 to 126 [6]	0.793 [6] @ 23°	1.440 [6] @ 23°	
1-Methyl-2-ethylidenecyclopentane 		123 to 124 [5]	0.7995 [5]	1.44421 [5]	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Cyclopentylbutene-2 (Buten-2-ylcyclopentane) 		156 to 158 [3]	0.806 [3] @ 24.5°	1.4482 [3] @ 25°	
1-Methyl-2-isopropylidenecyclopentane 		149 to 151 [4] @ 755mm	0.8104 [4] D_0^{20}	1.4518 [4]	
1-Methyl-2-isopropenylcyclopentane 		141 to 143 [4] @ 757mm	0.8005 [4]	1.4455 [4]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methylene-2,3,3-trimethylcyclopentane 		138 to 140 [1]			
$C_{10}H_{18}$ **1-Ethylidene-3-isopropylcyclopentane** 		172 to 174 [10]	0.809 [10]	1.4506 [10]	
1,2,2-Trimethyl-3-ethenylcyclopentane 		155 to 156 [2]	0.8024 [2] @ 24°	1.4439 [2] @ 25°	

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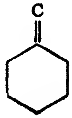
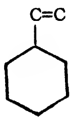
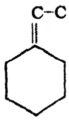
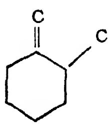
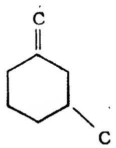
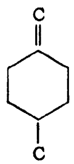
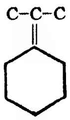
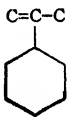
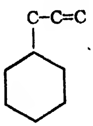
(13) O. Wallach and N. Speransky, Nachr. Ges. Wiss. Göttingen, **1902**, 92.
(14) N. D. Zelinsky, Ber. **34**, 3950, **1901**.

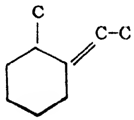
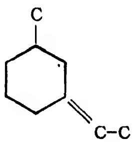
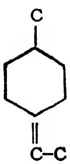
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Methylenecyclohexane 		**103.5** 105 to 106 [34] @ 770mm 102 to 103 [35] @ 764mm 105 to 106 [5,36,37] 103 to 106 [11,37] 103 to 104 [31] 102 to 103 [13] 101 to 102 [2] 102.5 [6] @ 756mm 100.5 to 101.3 [6] @ 756mm 101.2 to 102 [6] @ 751mm 104 [4,5] @ 749mm	**0.803_3** 0.7704 [35] @ 61.0° 0.7867 [35] @ 41.5° 0.7872 [35] @ 40.9° 0.7992 [4] 0.801 [5] 0.8018 [34] 0.802 to 0.804 [37] 0.8025 [36,37] 0.8032 [31] 0.8034 [2] 0.8074 [35] 0.8034 [6] @ 17.8° 0.8036 [6] @ 17.6° 0.8097 [35] @ 17.5° 0.8021 [5] @ 16.4° 0.8055 [6] @ 15.6° 0.8056 [6] @ 15.5° 0.8040 [5] @ 14° 0.8184 [13] D_0^0	**1.450_2** 1.4528 [31] 1.45227 [35] 1.4502 [4] 1.4501 [5,36,37] 1.4490 [2] 1.4491 to 1.4516 [37] 1.4486 [34] 1.45092 [6] @ 17.8° 1.45182 [5] @ 16.4° 1.45222 [6] @ 15.5° 1.45341 [6] @ 13.2° 1.44916 [35] $n_{H_\alpha}^{20}$ 1.44803 [6] $n_{H_\alpha}^{17.8}$ 1.44863 [5] $n_{H_\alpha}^{16.4}$ 1.44934 [6] $n_{H_\alpha}^{15.5}$ 1.45053 [6] $n_{H_\alpha}^{13.2}$ 1.45973 [35] $n_{H_\beta}^{20}$ 1.45820 [6] $n_{H_\beta}^{17.8}$ 1.45879 [5] $n_{H_\beta}^{16.4}$ 1.45958 [6] $n_{H_\beta}^{15.5}$ 1.46086 [6] $n_{H_\beta}^{13.2}$	$\frac{dD}{dt} = -0.0008$/°C. (0° to 60°)

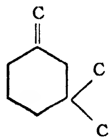
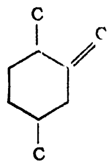
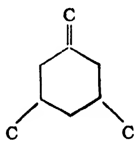
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
Methylenecyclohexane (*Continued*)					
				1.46567 [35] $n^{20}_{H_\gamma}$	
				1.46430 [6] $n^{17.8}_{H_\gamma}$	
				1.46488 [5] $n^{16.4}_{H_\gamma}$	
				1.46568 [6] $n^{15.5}_{H_\gamma}$	
				1.46696 [6] $n^{13.2}_{H_\gamma}$	
C_8H_{14} **Cyclohexylethylene**					
(Vinylcyclohexane) 		131 to 132 [22] @ 750mm 130 to 131 [24] @ 749mm	0.8134 [22] 0.8166 [24] @ 19°	1.4546 [22] 1.4550 [24] @ 19°	

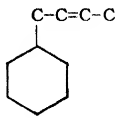
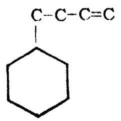
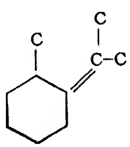
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Ethylidenecyclohexane		**137**			
		136 to 136.4 [6] @ 766mm	0.8220 [5] @ 20.3°	1.46299 [5]	
		137 to 138 [44]	0.8220 [44]	1.4626 [44]	
		135 to 136 [13]	0.8225 [14]	1.4591 [46] @ 19°	
		134 to 136 [46]	0.8235 [46] @ 19°	1.4577 [14] @ 19°	
			0.8286 [14] @ 19°	1.4631 [44] @ 18°	
			0.8230 [44] @ 18°	1.46389 [6] @ 17.6°	
			0.8237 [6] @ 17.6°	1.46094 [6] $n_{H_\alpha}^{17.6}$	
			0.8239 [6] @ 17.3°	1.4596 [5] $n_{H_\alpha}^{17.3}$	
				1.47139 [6] $n_{H_\beta}^{17.6}$	
				1.47010 [5] $n_{H_\beta}^{17.3}$	
				1.47773 [6] $n_{H_\gamma}^{17.6}$	
				1.47633 [5] $n_{H_\gamma}^{17.3}$	
1-Methylene-2-methyl-cyclohexane					
		122 to 125 [41]	0.808 [41] @ 22°	1.4516 [41] @ 22°	

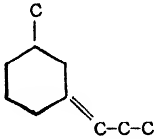
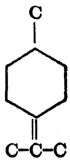
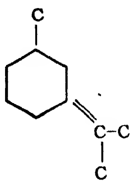
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
1-Methylene-3-methyl-cyclohexane			**0.795_8**		$[\alpha]^{15}_D = -30.22°$ [36]
		123 to 124 [35] @ 762mm 123 to 124 [36]	0.7610 [35] @ 61.9° 0.7614 [35] @ 61.5° 0.7778 [35] @ 42.1° 0.794 [36] 0.7970 [35] 0.797 [36] @ 18° 0.8003 [35] @ 16.3°	1.44626 [35] 1.4461 [36] 1.4466 [36] @ 18° 1.44337 [35] $n^{20}_{H_\alpha}$ 1.45336 [35] $n^{20}_{H_\beta}$ 1.45887 [35] n^{20}_{H}	$\frac{dD}{dt} = -0.00079/°C.$ (15° to 65°)
1-Methylene-4-methyl-cyclohexane		**121**	**0.798_5**	**1.446_1**	$\frac{dD}{dt} = -0.00086/°C.$ (15° to 90°)
	63 to 64 [38]	124 to 125 [35,36] @ 772mm 122 to 123 [43] 122 [29,38] 120 to 121 [2]	0.7407 [35] @ 87.3° 0.7412 [35,36] @ 86.7° 0.7634 [35,36] @ 60.9° 0.7925 [43] @ 22° 0.7920 [37] D^{20}_{20} 0.7945 [2] 0.7996 [35,39] 0.7923 [29] D^{19}_{19} 0.8033 [35,39] @ 15.9°	1.4446 [38,43] @ 22° 1.4483 [2] 1.44626 [35,36] 1.4450 [37] 1.4465 [29] @ 18° 1.44339 [35] $n^{20}_{H_\alpha}$ 1.45338 [35] $n^{20}_{H_\beta}$ 1.45890 [35] $n^{20}_{H_\gamma}$	$\frac{dn}{dt} = -0.00048/°C.$ (15° to 25°)

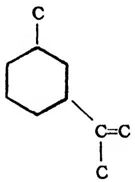
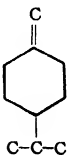
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Isopropylidenecyclohexane (2-Cyclohexylidenepropane) 		160 to 161 [45] 152 to 153 [16] @ 740mm	0.836 [45]	1.4723 [45]	
Isopropenylcyclohexane (2-Cyclohexylpropene-1) 		157 to 158 [25]			
1-Cyclohexylpropene-2 (Allylcyclohexane) 		154 to 154.4 [26] 152 [8] 149 to 151 [23] 148 to 140 [17] 148 to 149 [30]	0.816_7 0.8010 [17] @ 41.5° 0.8117 [17] @ 28.5° 0.808 [8] @ 21° 0.8160 [17] 0.8156 [23] 0.8196 [30] @ 13° 0.813 [8] @ 13° 0.8312 [30] @ 0°	1.450_6 1.4483 [17] @ 25° 1.449 [8] @ 21° 1.454 [23] 1.4528 [17] @ 15° 1.45362 [30] @ 13° 1.452 [8] @ 13°	$\frac{dD}{dt} = -0.0007_3$/°C. (0° to 45°) $\frac{dn}{dt} = -0.0004_5$/°C. (10° to 25°)

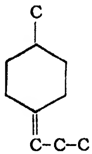
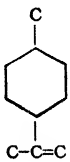
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-2-ethylidene-cyclohexane 		158 [27]	0.81 [27] @ 81° 0.823 [27] @ 0°	1.47 [27]	
1-Methyl-3-ethylidene-cyclohexane 		153 [44a] 152 [15]	0.813 [44a] 0.8135 [15] D_{19}^{19}	1.4584 [44a] 1.4590 [15] @ 19°	$[\alpha]_D = -50°$ [15]
1-Methyl-4-ethylidene-cyclohexane 		152 to 153 [49]	0.810 [49] @ 21° 0.812 [49] @ 19°	1.4571 [49] @ 21° 1.4574 [49] @ 19°	

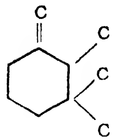
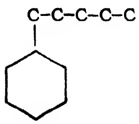
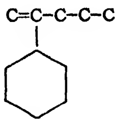
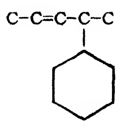
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methylene-3,3-dimethylcyclohexane 		138 to 141 [12] @ 739mm	0.7970 [12] @ 16.5° 0.8013 [12] @ 10°	1.44837 [12] @ 10°	
2-Methylene-1,4-dimethylcyclohexane 		135 to 136 [6] @ 764mm	0.7922 [6] @ 14.1°	1.446 [6] @ 14.6°	
1-Methylene-3,5-dimethylcyclohexane 		135 to 136 [4,6] @ 744mm	0.7918 [4,6] @ 14.6° 0.7922 [4,6] @ 14.1°	1.44628 [6] @ 14.6° 1.44334 [6] $n_{H_\alpha}^{14.6}$ 1.45313 [6] $n_{H_\beta}^{14.6}$ 1.45917 [6] $n_{H_\gamma}^{14.6}$	

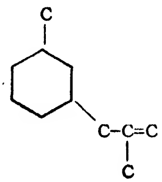
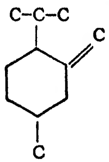
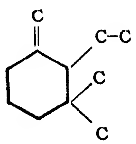
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Cyclohexylbutene-2 (Buten-2-ylcyclohexane) 		177 [8] 66 @ 14mm [7]	0.813 [8] @ 21° 0.818 [8] @ 13°	1.453 [8] @ 21° 1.457 [8] @ 13°	
1-Cyclohexylbutene-3 (Buten-3-ylcyclohexane) 		174.5 to 175 [22] 174 [8] 62 @ 14mm [8]	0.810 [8] @ 21° 0.8131 [22]	1.450 [8] @ 21° 1.453 [22]	
1-Cyclohexylbutene-*x*			0.815 [8]	1.454 [8] @ 13°	
1-Methyl-2-isopropylidenecyclohexane 		160 to 162 [42]	0.8345 [42]	1.4670 [42]	

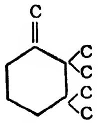
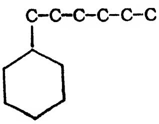
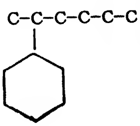
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-3-propylidenecyclohexane 		170 to 173 [48]	0.814 [48] @ 19°	1.4591 [48] @ 19°	$[\alpha]_D = -34° 28'$ [48]
1-Methyl-4-isopropylidenecyclohexane 		172 to 174 [39]	0.831 [39] @ 21°	1.4647 [39] @ 21°	
***l*-1-Methyl-3-isopropylidenecyclohexane** 		173 to 175 [42] 172.5 to 174.5 [21] @ 749mm	0.8250 [42] 0.8214 [21]	1.4569 [21] 1.4577 [21] 1.4582 [21] 1.4670 [42]	$[\alpha]_D = -0.51°$ [20]

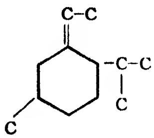
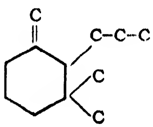
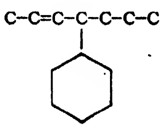
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
d-1-Methyl-3-isopropenylcyclohexane 		170 to 170.5 [21] @ 751mm	0.8178 [21] D_0^{20}	1.4546 [21]	$[\alpha]_D = +9.73°$ [21]
l-1-Methyl-3-isopropenylcyclohexane		170 to 171 [20] @ 749mm	0.8185 [20] D_0^{20}	1.4574 [20]	$[\alpha]_D = -8.06°$ [20]
1-Methylene-4-isopropylcyclohexane 			0.8667 [18]	1.4840 [18]	

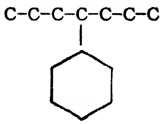
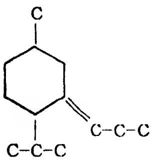
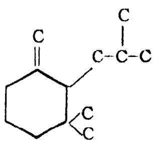
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-propylidenecyclohexane 		175 to 177 [48] 173 to 174 [40]	0.8110 [40] 0.8135 [48] @ 19°	1.4571 [40] 1.4516 [48] @ 19°	
1-Methyl-4-isopropylidenecyclohexane (*p*-Menthene-4) 		172 to 174 [6,36,40] 170 to 172 [7] 169 to 170 [32] @ 748mm	0.8189 [32] D_{21}^{22} 0.8345 [42] 0.831 [36] @ 21° 0.819 [7] @ 21° 0.8175 [7] @ 20.5°	1.4647 [36] 1.4670 [40] 1.45922 [7] 1.45862 [7] 1.45823 [32]	
1-Methyl-4-isopropenylcyclohexane (Dihydrolimonene) 		170 [19] @ 750mm 168 to 169 [32] @ 750mm 170 to 170.5 [28] @ 746mm 53 to 54 [33] @ 14mm	0.8217 [32] @ 21° 0.8142 [19] D_0^{20} 0.8104 [33] 0.810 [23] D_{15}^{15}	1.45673 [32] @ 21° 1.45662 [33] 1.4523 [19]	

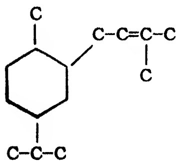
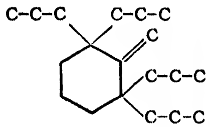
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
1-Methylene-2,3,3-trimethylcyclohexane					
(Methyl-γ-geraniolene) 		164 [12] @ 738mm	0.8320 [12] @ 11°	1.46274 [12] @ 15° 1.46414 [12] @ 11°	
$C_{11}H_{20}$					
1-Cyclohexylpentene-*x*					
		196 [8] 83 @ 14mm [8]	0.816 [8]	1.454 [8]	
2-Cyclohexylpentene-1					
		198 to 199 [8] 85 @ 16mm [8]	0.822 [8]	1.458 [8]	
4-Cyclohexylpentene-2					
		125.3 to 126.3 @ 95mm [26]	0.8322 [26] @ 25°	1.4595 [26] @ 25°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-3-(2-methylpropen-2-yl)-cyclohexane 		186.5 to 187.5 [47]	0.8120 [47]	1.4546 [47]	
2-Methylene-4-methyl-1-isopropylcyclohexane 		181 to 182 [1]	0.8273 [1] @ 16°		$[\alpha]_D = +87.25°$ [1]
1-Methylene-3,3-dimethyl-2-ethylcyclohexane (Ethyl-γ-geraniolene) 		182 to 184 [12] @ 745mm	0.8160 [12] @ 10°	1.46235 [12] @ 10°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methylene-2,2,3,3-tetramethylcyclohexane					
(Dimethyl-γ-cyclogeraniolene)		181 to 183 [12] @ 756mm	0.8246 [12] @ 11°	1.46275 [12] @ 12°	
					
$C_{12}H_{22}$					
1-Cyclohexylhexene-*x*					
		219 [8] 99 @ 16mm [8]	0.820 [8] @ 21°	1.457 [8] @ 21°	
2-Cyclohexylhexene-*x*					
		221 [8] 102 [8] @ 17mm	0.823 [8] @ 21°	1.459 [8] @ 21°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
5-Methyl-1-ethylidene-2-isopropylcyclohexane					$[\alpha]_D^{14} = +34.79°$ [1]
		58 to 59 [1] @ 4mm	0.8304 [1] @ 16°		
1-Methylene-3,3-dimethyl-2-propylcyclohexane					
(Propyl-γ-cyclogeraniolene)		200 to 202 [12] @ 741mm 83 to 85 [12] @ 12mm	0.8126 [12] @ 10°	1.46176 [12] @ 10.5°	
					
$C_{13}H_{24}$					
4-Cyclohexylheptene-2					
		135.6 to 136.6 [24] @ 45mm	0.8355 [24] @ 25°	1.4630 [24] @ 25°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Cyclohexylheptene-x 		226 to 228 [3] @ 755mm	0.8441 [3] @ 21°	1.467 [3] @ 21°	
1-Methyl-3-propylidene-4-isopropylcyclohexane 			0.8129 [1] @ 16.5°		
1-Methylene-3,3-dimethyl-2-(2-methylpropyl)-cyclohexane (Isobutyl-γ-cyclogeraniolene) 		212 to 213 [12] @ 742mm	0.8112 [12] @ 11°	1.46086 [12] @ 11°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-4-isopropyl-2-(3-methylbuten-2-yl)-cyclohexane 		127 to 128 [9] @ 19mm	0.8418 [9] D_{25}^{25}	1.4702 [9] @ 25°	
$C_{19}H_{36}$ **2-Methylene-1,1,3,3-tetrapropylcyclohexane** 		165 [10] @ 15mm	0.8618 [10] @ 16°	1.4800 [10] @ 16°	

(1) Akira Ogata and Chuji Mizashita, J. Pharm. Soc. Japan, **1922**, No. **484**, 4.
(2) N. Alexandrovitch, J. Gen. Chem. (U.S.S.R.) **3**, (65) 48, **1933**.
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(10) R. Cornubert, C. Borrel, M. De Demo, J. Garnier, R. Humeau, H. Le Bihan, and G. Sarkis, Bull soc. chim. [5] **2**, 195, **1935**.
(11) F. Ebel, R. Brunner, and P. Mangelli, Helv. Chim. Acta **12**, 19, **1929**.
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(16) C. Hell and O. Schaal, Ber. **40**, 4162, **1907**.
(17) C. D. Hurd and H. T. Bollman, J. Am. Chem. Soc. **55**, 699, **1933**.
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(19) N. Kishner, J. Russ. Phys. Chem. Soc. **43**, 951, **1911**.
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(22) R. Y. Levina and A. A. Potopova, J. Gen. Chem. (U.S.S.R.) **7**, 353, **1937**.
(23) R. Y. Levina and D. M. Trakhtenberg, J. Gen. Chem. (U.S.S.R.) **6**, 764, **1936**.
(24) R. Y. Levina and F. F. Zurikow, J. Gen. Chem. (U.S.S.R.) **6**, 1250, **1936**.
(25) K. Matsubara and W. H. Perkin, J. Chem. Soc. **87**, 661, **1905**.
(26) S. P. Mulliken, R. L. Wakeman, and H. T. Gerry, J. Am. Chem. Soc. **57**, 1605, **1935**.
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(28) W. H. Perkin and S. S. Pickles, J. Chem. Soc. **87**, 639, **1905**.
(29) W. H. Perkin and W. J. Pope, J. Chem. Soc. **99**, 1514, **1911**.
(30) B. de Rességuier, Bull. soc. chim. [4] **7**, 432, **1910**.
(31) N. A. Rosanow, J. Russ. Phys. Chem. Soc. **48**, 316, **1916**.
(32) F. W. Semmler and J. Feldstein, Ber. **47**, 384, **1914**.
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(34) A. I. Vogel, J. Chem. Soc. **1933**, 1028.
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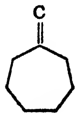
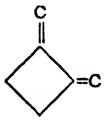
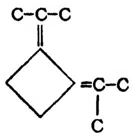
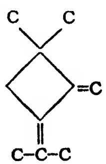
(43) O. Wallach and E. Evans, Ann. **347**, 345, **1906**.
(44) O. Wallach and E. Evans, Ann. **360**, 45, **1908**.
(44a) O. Wallach and E. Evans, Ann. **360**, 51, **1908**.
(45) O. Wallach and H. Mallison, Ann. **360**, 68, **1908**.
(46) O. Wallach and P. Mendelsohn-Bartholdy, Ann. **360**, 48, **1908**.
(47) O. Wallach and W. v. Rechenberg, Ann. **394**, 362, **1912**.
(48) O. Wallach and M. Rentschler, Ann. **360**, 60, **1908**.
(49) O. Wallach and M. Rentschler, Ann. **365**, 269, **1909**.

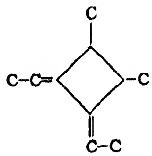
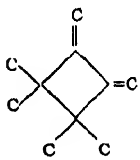
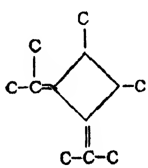
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Methylenecyclo-heptane 		138 to 140 [1]	0.824 [1,2]	1.4611 [1]	

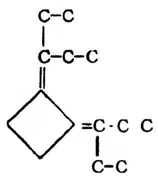
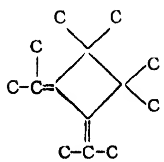
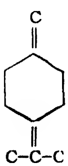
(1) O. Wallach, Ann. **345**, 139, 1906.
(2) O. Wallach and van Beeck-Vollenhoven, Ann. **314**, 156, 1900.

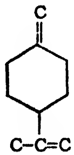
3. CYCLANES WITH TWO ALKENYL OR TWO OLEFIN SUBSTITUTIONS, C_nH_{2n-4}

C_6H_8

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2-Dimethylenecyclobutane 		63 to 65 [4]	0.7698 [4]	1.42317 [4]	
$C_{10}H_{16}$ **1,2-Diisopropylidenecyclobutane** 		179 to 181 [2] 61 to 62 [2] @ 9mm	0.8422 [2] 0.8571 [2] @ 0°	1.50086 [2] @ 19.7° 1.50622 [2] $n_{H_\alpha}^{19.7}$ 1.51251 [2] $n_{H_\beta}^{19.7}$ 1.52345 [2] $n_{H_\gamma}^{19.7}$	$\frac{dD}{dt} = -0.007_5$/°C. (0° to 20°)
2-Methylene-1,1-dimethyl-3-isopropylidenecyclobutane 		149 to 150 [2] @ 752mm 37 to 39 [2] @ 9mm	0.7982 [2] 0.8143 [2] @ 0°	1.46769 [2] @ 19.7° 1.46319 [2] $n_{H_\alpha}^{19.7}$ 1.47729 [2] $n_{H_\beta}^{19.7}$	$\frac{dD}{dt} = -0.0008$/°C. (0° to 20°)

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Dimethyl-3,4-diethylidenecyclobutane					
		163 [7] @ 762mm 65 @ 22mm [7]	0.8113 [7]	1.47850 [7] 1.47423 [7] $n^{20}_{H_\alpha}$ 1.48913 [7] $n^{20}_{H_\beta}$ 1.49838 [7] $n^{20}_{H_\gamma}$	
1,2-Dimethylene-3,3,4,4-tetramethylcyclobutane					
		140 to 141 [5] 66 to 67 [5] @ 55mm	0.7927 [5]	1.4606 [5] 1.4570 [5] $n^{20}_{H_\alpha}$ 1.4699 [5] $^{20}_{H_\beta}$ 1.4781 [5] n^{20}_{H}	
$C_{12}H_{20}$ **1,2-Dimethyl-3,4-diisopropylidenecyclobutane**					
		190 to 191 [6] @ 754mm 69 to 70 [6] @ 11mm	0.8247 [6]	1.48337 [6] 1.47946 [6] $n^{20}_{H_\alpha}$ 1.49282 [6] $n^{20}_{H_\beta}$ 1.50297 [6] n^{20}_{H}	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2-Di-(1-ethylpropylidene)-cyclobutane 		102 to 104 [8] @ 10mm	0.8569 [8] @ 16.5°	1.48643 @ 16.5°	
1,1,2,2-Tetramethyl-3, 4-diisopropylidene-cyclobutane 		86 to 88 [8] @ 9mm	0.8457 [8] @ 15.6° 0.8563 [8] @ 0°	1.49535 [8] @ 15.6°	$\frac{dD}{dt} = -0.0006_8$/°C. (0° to 20°)
$C_{10}H_{16}$ ***d*-1-Methylene-4-isopropylidenecyclohexane** 		69 to 73 [9] @ 20mm	0.8515 [9] D_{16}^{16}	1.4785 [9] @ 18°	$[\alpha]_D = +2.5°$ [9]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methylene-4-isopropenylcyclohexane 		65 to 66 [1] @ 11mm	0.8735 [1] D_{20}^{20}	1.4870 [1]	

(1) M. A. Iskenderov, J. Gen. Chem. (U.S.S.R.) **7**, 1435, 1937.
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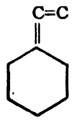
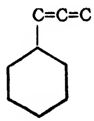
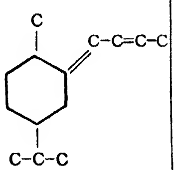
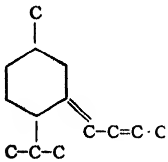
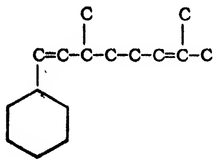
(7) S. Lebedev and B. Mereshkowsky, J. Russ. Phys. Chem. Soc. **45**, 1354, 1913.
(8) B. Mereshkowsky, J. Russ. Phys. Chem. Soc. **45**, 1940, 1913.
(9) F. Richter and W. Wolff, Ber. **60**, 477, 1927; **63**, 1714, 1930.
(10) O. Wallach, Ann. **359**, 283, 1908.

4. CYCLANES WITH AN ALKADIENYL OR DIOLEFIN SUBSTITUTION C_nH_{2n-4}

C_8H_{12}

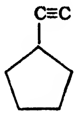
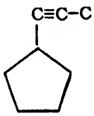
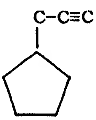
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Ethenylidenecyclohexane 		138 to 141 [1]	0.8508 [1] D_0^{20} 0.8682 [1] D_0^0	1.4826 [1]	$\frac{dD}{dt} = -0.0008_7$/°C. (0° to 20°)
C_9H_{14} **Propadienylcyclohexane** 		155 to 156 [2] @ 755mm	0.8239 [2]	1.4658 [2]	
$C_{14}H_{24}$ **1-Methyl-4-isopropyl-2-buten-2-ylidene-cyclohexane** 		108 to 109 [3] @ 12mm			

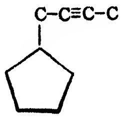
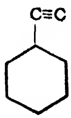
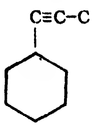
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-isopropyl-3-buten-2-ylidene-cyclohexane 		99 @ 12mm [4]			
$C_{16}H_{28}$ **l-3,7-Dimethyl-1-cyclohexyloctadiene-1,6** 		142 to 143 [3] @ 9mm	0.8468 [3]		$[\alpha]_D^{20} = -6.4°$ [3]

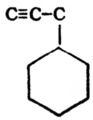
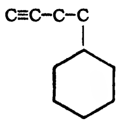
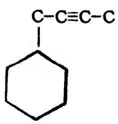
(1) W. Jegorowa, J. Russ. Phys. Chem. Soc. **43,** 1119, 1911.
(2) R. Y. Levina and D. M. Trakhtenberg, J. Gen. Chem. (U.S.S.R.) **6,** 764, 1936.
(3) H. Rupe, Ann. **402,** 176, 1913.
(4) H. Rupe and A. Gassmann, Helv. Chim. Acta **12,** 193, 1929.
(5) H. Rupe and Fr. Kuenzy, Helv. Chim. Acta **14,** 708, 1931.

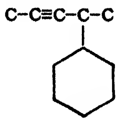
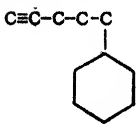
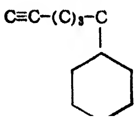
5. CYCLANES WITH AN ALKYNYL OR ACETYLENE SUBSTITUTION, C_nH_{2n-4}

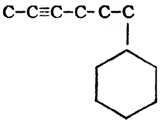
C_7H_{10}

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Ethynylcyclopentane 		107 to 109 [4]	0.825 [4] @ 22°	1.4505 [4] @ 18°	
C_8H_{12} **1-Cyclopentylpropyne-1** (Propyn-1-ylcyclopentane) 		142 to 143 [4]	0.843 [4] @ 22°	1.4636 [4] @ 22°	
3-Cyclopentylpropyne-1 (Propyn-2-ylcyclopentane) 		132.5 to 133.5 [5]	0.828 [5] @ 24°	1.4494 [5] @ 24°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Cyclopentylbutyne-2					
(Butyn-2-ylcyclopentane)		164 to 165 [5]	0.842 [5] @ 26°	1.4621 [5] @ 26°	
					
C_8H_{12} **Ethynylcyclohexane**					$\frac{dD}{dt} = -0.00089/°C.$ (0° to 20°)
		130 to 132 [4,6]	0.832 [4] @ 23° 0.8424 [6] D_0^{20} 0.8602 [6] D_0^0	1.4558 [4] @ 23° 1.4597 [6]	
C_9H_{14} **1-Cyclohexylpropyne-1**					
(Propyn-1-ylcyclohexane)		162 to 164 [4]	0.851 [4] @ 22°	1.4682 [4] @ 22°	
					

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Cyclohexylpropyne-1					
		157.5 to 160 [9] @ 762mm 157 to 160 [7] 157 to 158 [3] 157 [1] 55 @ 17mm [3] 48 @ 12mm [1] 48 @ 11mm [3]	0.836 [1] 0.8449 [9] 0.844 [3] @ 18°	1.459 [1] 1.4605 [9] 1.4603 [3] @ 18°	
$C_{10}H_{16}$					
4-Cyclohexylbutyne-1					
		70 @ 17mm [2] 61 to 62 [8] @ 7mm	0.8462 [8]	1.4614 [8]	
1-Cyclohexylbutyne-2					
		79 @ 17mm [2]			

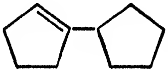
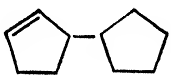
Name and Carbon Skeleton	M. P.,°C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Cyclohexylpentyne-2 		93 @ 17mm [2]			
5-Cyclohexyl-pentyne-1 		84 @ 16mm [2]			
$C_{12}H_{20}$ **6-Cyclohexyl-hexyne-1** 		101 @ 16mm [2]			

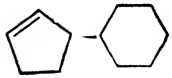
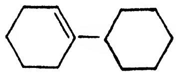
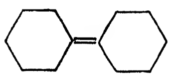
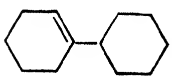
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
6-Cyclohexyl-hexyne-2 		109 to 110 [2] @ 17mm			

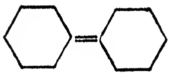
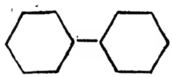
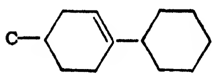
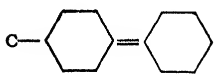
(1) M. Bourguel, Compt. rend. **177**, 688, **1923.**
(2) M. Bourguel, Compt. rend. **179**, 686, **1925.**
(3) M. Bourguel, Ann. chim. [10] **3**, 191, **1925.**
(4) B. Grédy, Compt. rend. **199**, 153, **1934.**
(5) B. Grédy, Compt. rend. **199**, 1129, **1934.**
(6) W. Jegorowa, J. Russ. Phys. Chem. Soc. **43**, 1119, **1911.**
(7) R. Lespieau, Bull. soc. chim. [4] **29**, 528, **1921.**
(8) R. Levina and A. Ivanov, J. Gen. Chem. (U.S.S.R.) **7** (69), 1866, **1937.**
(9) R. Levina and D. M. Trakhtenberg, J. Gen. Chem. (U.S.S.R.) **6**, 764, **1936.**

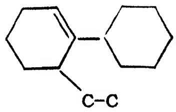
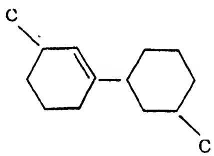
6. CYCLANES WITH A CYCLOALKENYL OR CYCLOÖLEFIN SUBSTITUTION, C_nH_{2n-4}

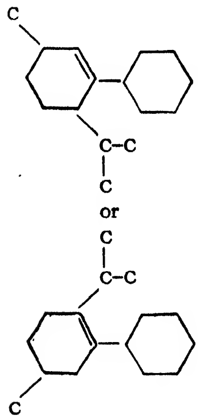
$C_{10}H_{16}$

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Cyclopentylcyclopentene-1 		189 to 191 [18] @ 744mm 190 [5] @ 730mm	0.8898 [18]	1.499 [5] n_{He}^{20} 1.50047 [5] $n_{He}^{16.5}$	
1-Cyclopentylcyclopentene-1 or -2  or 		196.5 to 198 [17] 190 [3] 83 to 85 [3] @ 20mm 82 to 83 [4] @ 17mm 79 @ 13mm [4]	0.8593 [4] @ 22.5° 0.9080 [17] @ 19.5° 0.9183 [3] @ 18°	1.4863 [4] @ 22.5° 1.4938 [17] @ 19.5° 1.4953 [3] @ 18° 1.48284 [4] $n_{H_\alpha}^{22.5}$ 1.49979 [4] $n_{H_\gamma}^{22.5}$	
1-Cyclopentylcyclopentene-2 		63 @ 9mm [1]	0.8838 [1]		

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Cyclohexylcyclo-pentene-2					
(Cyclopenten-2-ylcyclo-hexane) 		80 to 85 [1] @ 12mm	0.8995 [1] @ 18°	1.48698 [1]	
$C_{12}H_{20}$ **1-Cyclohexylcyclo-hexene-1**					
(Cyclohexen-1-ylcyclo-hexane) 	−41 [5]	238.5 [18] 237 [16] 110 [5] @ 13mm 100 [18] @ 8.5mm 85 to 88 [13] @ 4mm	0.9010 [16] 0.9086 [18] 0.906 [13] D_{20}^{20} 0.9071 [5] @ 19.4°	1.4910 [16] 1.4916 [18] 1.4969 [13] 1.49556 [5] $n_{He}^{17.6}$	
Cyclohexylidenecyclo-hexane or 1-Cyclohexylcyclo-hexene-1					
 or 		241 [11] 124 [9] @ 20mm	0.923 [9] @ 0°		

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclohexylidene-cyclohexane 		240 [12] 236 to 237 [18] @ 742mm	1.0109 [18] @ 15°	1.4955 [18] @ 15°	
Cyclohexylcyclo-hexene-*x* 	−45 [14]	238 to 239 [14] 103 to 105 [14] @ 12mm	0.904 [14]	1.493 [14]	
$C_{13}H_{22}$ **4-Methyl-1-cyclo-hexylcyclohexene-1 or 4-Methyl-1-cyclo-hexylidenecyclohexane**  or 		158 [8] @ 35mm	0.901 [8] @ 10°	1.489 [8] @ 10°	

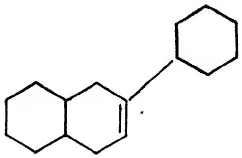
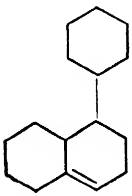
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
6-Ethyl-1-cyclohexyl-cyclohexene-1 		141 to 143 [2] @ 20mm	0.9274 [2] 0.9406 [2] @ 0°	1.5108 [2]	$\frac{dD}{dt} = -0.0006_6$/°C. (0° to 20°)
***d*-3-Methyl-1-(5-methylcyclohexyl)-cyclohexene-1** 		257 to 259 [6]	0.9119 [6] D_0^{20} 0.9128 [6] D_0^0		$[\alpha]_D = +0.28°$ [6]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Methyl-6-isopropyl-1-cyclohexylcyclohexene-1 or 5-Methyl-2-isopropyl-1-cyclohexylcyclohexene-1 		265 [7] 260 [7] @ 756mm	0.9198 [7] @ 14° 0.9897 [7] @ 0°	1.498 [7]	$[\alpha]_D = +6.2°$ [7]

(1) J. v. Braun, E. Kamp, and J. Kopp, Ber. **70B**, 1750, 1937.
(2) C. E. Garland and E. E. Reid, J. Am. Chem. Soc. **47**, 2333, 1925.
(3) M. Godchot and F. Taboury, Compt. rend. **154**, 1626, 1912.
(4) C. Harries and H. Wagner, Ann. **410**, 29, 1915.
(5) W. Hückel, O. Neunhoeffer, A. Gercke, and E. Frank, Ann. **477**, 99, 1929.
(6) W. Markownikow, J. Russ. Phys. Chem. Soc. **35**, 1069, 1903.
(7) M. Murat, J. pharm. chim. [7] **4**, 297, 299, 1911.
(8) P. Sabatier and A. Mailhé, Ann. chim. [8] **10**, 563, 1907.
(9) P. Sabatier and A. Mailhé, Compt. rend. **138**, 1323, 1904.
(10) P. Sabatier and A. Mailhé, Compt. rend. **139**, 343, 1904.
(11) P. Sabatier and M. Murat, Compt. rend. **154**, 1390, 1912.
(12) J. B. Senderens and J. Aboulenc, Compt. rend. **183**, 830, 1926.
(13) F. K. Signaigo and P. L. Cramer, J. Am. Chem. Soc. **55**, 3326, 1933.
(14) R. Truffault, Compt. rend. **200**, 406, 1935.
(15) E. D. Venus-Danilova, J. Russ. Phys. Chem. Soc. **61**, 1479, 1929.
(16) O. Wallach, Ann. **381**, 95, 1911.
(17) O. Wallach, Ann. **389**, 181, 1912.
(18) N. D. Zelinsky, N. Shuikin, and L. Fatejev, J. Gen. Chem. (U.S.S.R.) **2**, 671, 1932.

7. CYCLANES WITH A BICYCLENYL OR BICYCLOÖLEFIN SUBSTITUTION, C_nH_{2n-6}

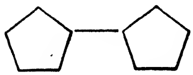
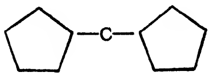
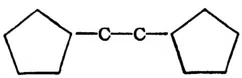
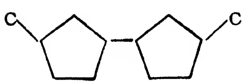
$C_{16}H_{28}$

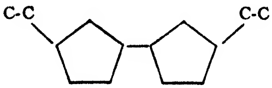
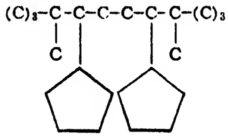
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Cyclohexyl-[0,4,4]-bicyclodecene-3 (2-Cyclohexyl-Δ²-octahydronaphthalene) 		163 to 164 [1] @ 13mm	0.9422 [1]	1.51029 [1]	
2-Cyclohexyl-[0,4,4]-bicyclodecene-(5-6) 		162 to 163 [1] @ 12mm	0.9546 [1]	1.51754 [1]	

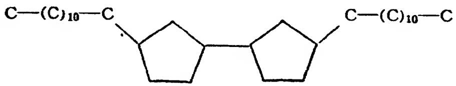
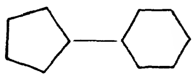
(1) B. Alberti, Ann. **450**, 304, 1926.

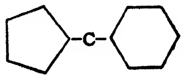
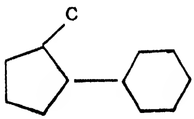
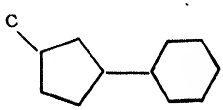
III. DICYCLANES OR DICYCLOPARAFFINS

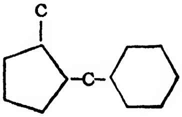
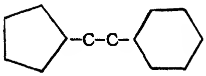
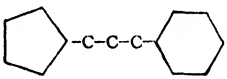
1. Dicyclanes With Alkyl Substitutions, C_nH_{2n-2}

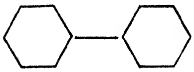
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclopentylcyclopentane			**0.8616**	**1.4640**	$\frac{dD}{dt} = -0.000756_6/°C.$ (20° to 50°)
(Dicyclopentyl) 		189 to 191 [12,37] 188 to 189 [67] @ 753mm 189 to 190 [63] @ 750mm	0.8389 [12] @ 50° 0.8648 [63] 0.8612 [12] 0.8604 [67]	1.4652 [67] 1.4640 [63] 1.4638 [12] 1.4660 [12] @ 15°	
$C_{11}H_{20}$ **Dicyclopentylmethane**					
		208 to 210 [42]	0.8710 [42]	1.46974 [42]	
$C_{12}H_{22}$ **1,2-Dicyclopentylethane**					
		206 to 207 [62] @ 748mm 109 to 110 [44] @ 17mm	0.8583 [62] @ 22° 0.8633 [44]	1.4651 [62] @ 22° 1.4657 [44]	
3-Methyl-1-(3-methylcyclopentyl)-cyclopentane					
(3,3′ Dimethyldicyclopentyl) 	46 to 47 [22]	218 to 219 [66] 213 to 215 [64] 213 to 214 [55] @ 738mm	0.8784 [55] 0.8751 [66] @ 18.5°	1.4755 [55] 1.4755 [66] @ 18.5°	

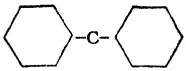
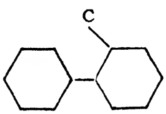
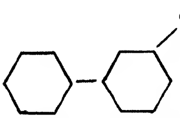
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Ethyl-1-(3-ethylcyclopentyl)-cyclopentane					
(3,3′ Diethyldicyclopentyl) 		125 [6] @ 15mm	0.8757 [6] @ 15°	1.47097 [6]	
$C_{24}H_{46}$ 4,9-Dimethyl-5,8-dicyclopentyldodecane					
		172 [7] @ 0.2mm	0.8690 [7]		

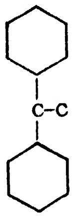
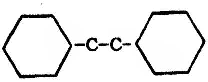
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Dodecyl-1-(3-dodecylcyclopentyl)-cyclopentane (3,3′ Didodecyldicyclopentyl) 		260 [6] @ 0.2mm			
$C_{11}H_{20}$ **Cyclopentylcyclohexane** 		225 to 227 [61] 215.5 [12] 214 [65] 86 to 88 [6] @ 11mm	0.8535 [12] @ 50° 0.8886 [6] @ 23° 0.8813 [61] @ 21° 0.8780 [65] @ 21° 0.8758 [12]	1.4767 [61] @ 21° 1.4728 [65] @ 21° 1.47491 [6] 1.4728 [12] 1.4749 [12] @ 15°	

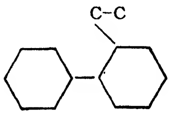
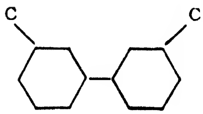
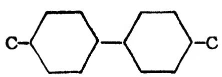
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopentylcyclohexylmethane 		225 to 227 [65] 223 to 225 [42] 224 to 226 [9,11] @ 750mm	0.8721 [9,11] @ 23° 0.8681 [42] 0.8789 [65] @ 19°	1.4671 [9,11] @ 23° 1.47131 [42] 1.4775 [65] @ 19°	
(2-Methylcyclopentyl)-cyclohexane (1-Methyl-2-cyclohexyl-cyclopentane) 		225.5 to 227 [64] @ 744mm	0.8680 [64]	1.4701 [64]	
(3-Methylcyclopentyl)-cyclohexane (1-Methyl-3-cyclohexyl-cyclopentane) 		231 to 233 [61]	0.8902 [61] @ 17°	1.4787 [61] @ 17°	

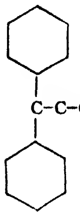
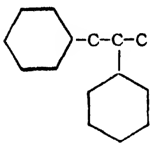
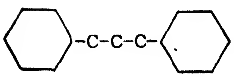
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
(2-Methylcyclopentyl)-cyclohexylmethane					
		239 to 241 [42]	0.8712 [42]	1.47369 [42]	
1-Cyclopentyl-2-cyclohexylethane					
		251 to 252 [10] @ 752.5mm 74 to 76 [45] @ 2mm	0.8780 [10] @ 21° 0.8746 [45]	1.4775 [10] @ 21° 1.4723 [45]	
$C_{14}H_{26}$					
1-Cyclopentyl-3-cyclohexylpropane					
		268 to 270 [10] @ 748.2mm	0.8751 [10]	1.4765 [10]	

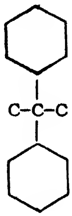
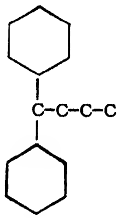
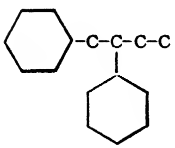
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclohexylcyclohexane		**235**	**0.8846**	**1.4796**	$\frac{dn}{dt} = -0.000485/°C.$ (15° to 25°)
(Dicyclohexyl) 	−1 [57] 0 [19] 2 [19] 2.25 [19] 2.75 [35] 4 [18,50]	233.5 to 235 [41] @ 762mm 240 to 241 [20] 239.5 to 240 [66] 238 to 239 [12] 236.5 to 237.5 [56] 236 to 237.5 [23] 235 [29] 234 to 236 [46] 234 to 235 [4] 234 [3,18] 233 to 234 [50] 233 [49] 231 to 233 [27] 227 [59] 220 to 228 [5] 236 to 238 [35] @ 757.5mm 237 to 238.5 [23] @ 757mm 236 to 238 [64] @ 754mm 234 to 236 [30] @ 752mm 216 to 219 [40] @ 739mm 234 [19] @ 736mm 233 [19] @ 736mm 232.5 [19] @ 736mm 124 [48] @ 20mm 105 [57] @ 15mm	0.8833 [27] @ 25° 0.8947 [19] @ 21.8° 0.8862 [19] @ 20.6° 0.8790 [39] 0.8804 [5] 0.8835 [23] 0.8845 [41] 0.8847 [66] 0.8848 [12] 0.8912 [64] 0.8919 [23] 0.877 [56] D_{20}^{20} 0.880 [14] D_{20}^{20} 0.8644 [30] D_0^{20} 0.8876 [19] @ 19.6° 0.873 [49,50] D_0^{19} 0.8777 [30] @ 0° 0.923 [48] D_0^0	1.4772 [27] @ 25° 1.4740 [39] 1.4766 [59] 1.4785 [57] 1.4792 [5,41] 1.4795 [12] 1.4798 [56] 1.4800 [14,66] 1.4842 [64] 1.477 [49,50] @ 19° 1.4815 [22] @ 18° 1.4817 [12] @ 15° 1.47967 [19] $n_{He}^{21.1}$ 1.47977 [19] $n_{He}^{21.1}$ 1.4795 [19] n_{He}^{20} 1.4802 [19] n_{He}^{20} 1.4803 [19] n_{He}^{20}	

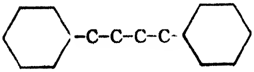
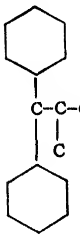
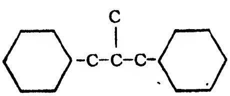
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Dicyclohexylmethane		**251**	**0.8808**		$\frac{dD}{dt} = -0.000783/°C.$ (20° to 80°)
		250 to 252[24] @ 763mm	0.8342[13] @ 79.5°	1.4755[21] @ 21°	
		251.5[13]	0.8884[1]	1.4752[67]	
		250 to 252[67]	0.8750[67]	1.4875[1]	
		250 to 251[49]	0.8851[21]	1.4786[21]	
		150[13] @ 45mm	D_{20}^{20} 0.8829[51]	1.45053[13] $n_{H_\alpha}^{79.5}$	
		110 to 110.5[1] @ 18mm	D_0^{20} 0.8743[21]	1.47475[13] $n_{H_\alpha}^{19.7}$	
			D_0^{20} 0.8765[13] @ 19.7°	1.45862[13] $n_{H_\beta}^{79.5}$	
				1.48328[13] $n_{H_\beta}^{19.7}$	
				1.46336[13] $n_{H_\gamma}^{79.5}$	
				1.48828[13] $n_{H_\gamma}^{19.7}$	
2-Methyl-1-cyclohexyl-cyclohexane					
(2-Methyldicyclohexyl)		131 to 133.5[17] @ 20mm	0.9058[17]	1.4968[17]	
			0.9203[17] @ 0°		
					
3-Methyl-1-cyclohexyl-cyclohexane					
(3-Methyldicyclohexyl)		243 to 243.5[43]	0.88668[43]	1.4840[43]	
		240[34]	0.9138[43] @ 18°	1.492[34]	
			0.9634[34] @ 0°		
					

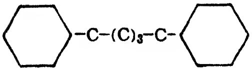
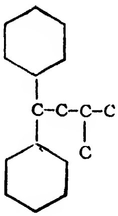
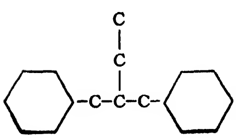
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Dicyclohexylethane 		256 to 257 [49, 50, 51] 264 to 265 [60] @ 740mm 112 @ 7mm [1]	0.9070 [1] @ 25° 0.9271 [51] 0.9130 [49] D_0^{20}	1.4887 [1] @ 25° 1.500 [49] 1.511 [51]	
1,2-Dicyclohexylethane			**0.877_0**	**1.4768**	$\frac{dn}{dt} = -0.00041/°C.$ (15° to 25°)
		263 to 264 [15] 274 to 275.5 [20] 273 [12] 270 to 271 [49,50] 266 to 268 [60] @ 748mm 145 to 150 [15] @ 20mm 133 to 134 [54] @ 13.5mm 147 to 148.5 [1] @ 12mm 132 [8] @ 8mm 93 to 94 [45] @ 2mm	0.8758 [8] D_{25}^{25} 0.8795 [45] 0.8760 [12] 0.8772 [54] D_{20}^{20} 0.8838 [49,50] D_0^{18} 0.8774 [1] @ 18°	1.4749 [8] @ 25° 1.4765 [45] 1.480 [49,50] @ 18° 1.4760 [1] @ 18° 1.4790 [12] @ 15°	

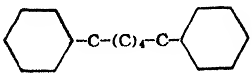
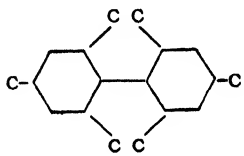
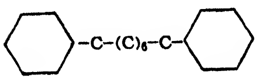
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Ethyl-1-cyclohexyl-cyclohexane (2-Ethyldicyclohexyl) 		141 to 142.5 [17] @ 20mm	0.9126 [17] 0.9240 [17] @ 0°	1.4964 [17]	
***l*-3-Methyl-1-(3-methyl-cyclohexyl)-cyclohexane** (3,3′ Dimethyldicyclo-hexyl) 		264 [31] @ 761mm 148 to 149 [31] @ 30mm	0.8803 [31] D_{20}^{20} 0.8789 [31] D_0^{20} 0.8924 [31] D_0^0		$[\alpha]_D = -3.44°$ [31]
4-Methyl-1-(4-methyl-cyclohexyl)-cyclohexane (4,4′ Dimethyldicyclohexyl) 		240 to 242 [58]			

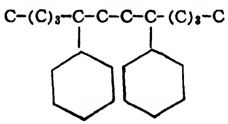
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
1,1-Dicyclohexyl-propane 		270 to 271 [49,52]	0.8887 [49,52] D_0^{23} 0.9038 [49,52] D_0^0	1.485 [49,52] @ 23°	$\frac{dD}{dt} = -0.0006_6$/°C. (0° to 20°)
1,2-Dicyclohexyl-propane 		272 to 273 [49,52]	0.8725 [49,52] D_0^{21} 0.8891 [49,52] D_0^0	1.479 [49,52] @ 21°	$\frac{dD}{dt} = -0.0007_9$/°C. (0° to 20°)
1,3-Dicyclohexyl-propane 	− 30 [16]	291 to 292 [16] 289 to 290 [49,52]	0.8752 [16] D_{24}^{24} 0.8701 [49,52] D_0^{21} 0.8874 [49,52] D_0^0	1.4736 [16] @ 24° 1.475 [49,52] @ 21°	$\frac{dD}{dt} = -0.0008_2$/°C. (0° to 20°)

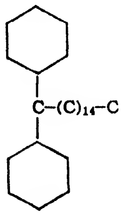
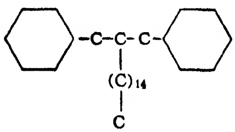
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2-Dicyclohexyl-propane 		273 to 274 [49,52]	0.9002 [49,52] D_0^{23} 0.9158 [49,52] D_0^0	1.490 [49,52] @ 23°	$\frac{dD}{dt} = -0.0006_8$/°C. (0° to 20°)
$C_{16}H_{30}$					
1,1-Dicyclohexyl-butane 		280 to 282 [49,53]	0.8842 [49,53] D_0^{16} 0.8922 [49,53] D_0^0	1.485 [49,53] @ 16°	
1,2-Dicyclohexyl-butane 		276 to 278 [49,53]	0.9084 [49,53] D_0^{18} 0.9104 [49,53] D_0^0	1.500 [49,53] @ 18°	

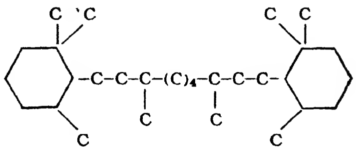
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,4-Dicyclohexyl-butane 	9 [53] 12 [28]	304 to 306 [53] 294 [28] @ 725mm	0.8772 [53] D_0^{21}	1.475 [53] @ 21°	
2-Methyl-1,1-dicyclo-hexylpropane 		278 to 279 [49,53]	0.8906 [49,53] D_0^{15} 0.9017 [49,53] D_0^{0}	1.492 [49,53] @ 15°	$\frac{dD}{dt} = -0.0007_4$/°C. (0° to 15°)
2-Methyl-1,3-dicyclo-hexylpropane 		290 to 292 [49,53]	0.8840 [49,53] D_0^{19} 0.8916 [49,53] D_0^{0}	1.484 [49,53] @ 19°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5-Dicyclohexyl-pentane  		315 [25] 311 [49,53]	0.8719 [49,53] D_0^{21} 0.8836 [29] @ 0° 0.8832 [49,53] D_0^0	1.479 [49,53] @ 21° 1.478 [25]	$\frac{dD}{dt} = -0.0005_6$/°C.
3-Methyl-1,1-dicyclo-hexylbutane  		290 to 291 [49,53]	0.8940 [49,53] D_0^{21} 0.9058 [49,53] D_0^0	1.489 [49,53] @ 21°	$\frac{dD}{dt} = -0.0005_6$/°C. (0° to 20°)
2-Ethyl-1,3-dicyclo-hexylpropane  		296 [49,53]	0.8846 [49,53] D_0^{21} 0.8966 [49] D_0^0	1.483 [49,53] @ 21°	$\frac{dD}{dt} = -0.0005_7$/°C. (0° to 20°)

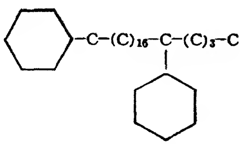
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,6-Dicyclohexyl-hexane 		212 [28] @ 14mm			
2,4,6-Trimethyl-1-(2,4,6-trimethylcyclohexyl)-cyclohexane (2,4,6,2′,4′,6′ Hexamethyl-dicyclohexyl) 		123 to 126 [2] @ 3mm	0.8932 [2] D_{25}^{25}	1.4873 [2] @ 25°	
$C_{20}H_{38}$ 1,8-Dicyclohexyloctane 	26 [28]				

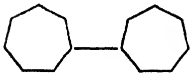
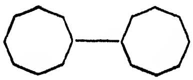
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Bis-(1-Methyl-4-isopropyl)-cyclohexane					
(Dimenthyl)	105.5 to 106 [29]	217 to 220 [29] @ 40mm 195 to 197 [29] @ 30mm 185 to 186 [29] @ 21mm 199 to 202 [29] @ 21mm	0.8925 [29] D_{20}^{20} 0.8911 [29] D_0^{20}		
$C_{24}H_{46}$ 5,8-Dicyclohexyldodecane					
		170 [7] @ 0.2mm	0.8823 [7] @ 15°		

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1-Dicyclohexylhexadecane 	18.5 to 19.5 [32]	269 to 271 [32] @ 15mm 260 to 264 [32] @ 10mm	0.8791 [32]	1.48620 [32] @ 17.5°	
$C_{30}H_{58}$ **1,3-Dicyclohexyl-2-pentadecylpropane** (1-Cyclohexyl-2-hexahydrobenzylheptadecane) 		288 to 290 [32] @ 17mm 279 to 281 [32] @ 10mm	0.8860 [32]	1.4911 [32] @ 15°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,8-Dimethyl-1,10-di-(2,2,6-trimethylcyclohexyl)-decane 		166 to 168 [26] @ 0.025mm	0.8860 [26] @ 17.3°	1.48583 [26] @ 17.3°	

$C_{34}H_{66}$

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,18-Dicyclohexyldocosane 		255 to 260 [38] @ 1mm			

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cycloheptylcyclo-heptane (Dicycloheptyl) 		290 to 291 [33] 290 to 291 [36] @ 728mm	0.9069 [36] D_0^{20} 0.9195 [36] D_0^0		$\frac{dD}{dt} = -0.0006_3$/°C. (0° to 20°)
$C_{16}H_{30}$ **Cyclooöctylcyclo-öctane** (Dicycloöctyl) 		140 [47] @ 1mm	0.9277 [47] 0.9292 [47] @ 18.2°	1.5018 [47]	
$C_{30}H_{58}$ **Cyclopentadecylcyclo-pentadecane** (Dicyclopentadecyl)	44 [47]		0.866 [47] @ 100° 0.8728 [47] @ 88.6°	1.4748 [47] @ 100°	$\frac{dD}{dt} = -0.0006$/°C. (85° to 100°)

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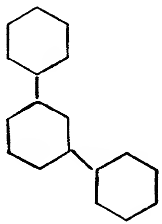
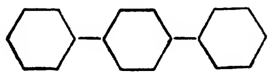
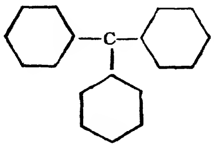
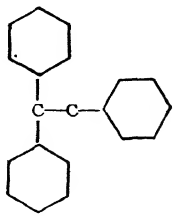
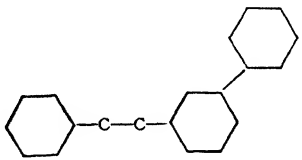
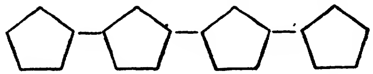
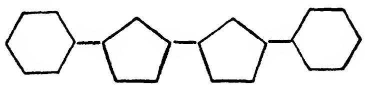
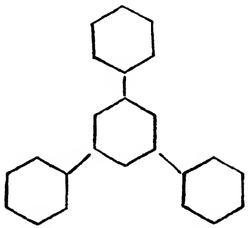
IV. TRI-, TETRA-, AND PENTACYCLANES, C_nH_{2n-4}, C_nH_{2n-6}, C_nH_{2n-8}

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Dicyclohexylcyclohexane					
	66 [12] 66 to 67 [13]	202 [12] @ 14mm 192 to 196 [13] @ 12mm 160 to 163 [10] @ 3mm	0.9121 [10]	1.4938 [10]	
1,4-Dicyclohexylcyclohexane					Isomeric forms separated by crystallizing from alcohol. Authors do not know what the difference is. [3]
					
Isomer I	54 to 56 [5] 55 to 57 [3]				Isomers formed by hydrogenation of dicyclohexylbenzene. No explanation is given for the difference. [5]
Isomer II	158 to 159 [5] 162 [3]				

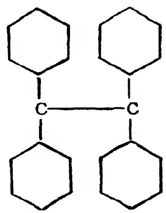
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Tricyclohexylmethane 	48 to 48.5 [7] 61 [11]	340 to 345 [15] 322 to 329 [7] 140 @ 20mm [6] 180 [11] @ 12mm 164 to 165 [2] @ 3mm 161 to 163 [2] @ 2mm	0.9274 [7] @ 50° 0.9263 [7] D_0^{50}	1.4965 [7] @ 50° 1.4986 [7] @ 40°	
$C_{20}H_{36}$ **1,1,2-Tricyclohexylethane** 		191 to 192 [14] @ 8mm	0.9301 [14] @ 25°	1.5030 [14] @ 25°	

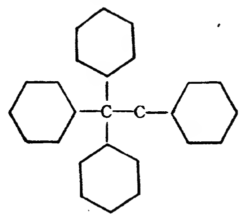
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Cyclohexyl-2-(3-cyclohexylcyclohexyl)-ethane 		192 [8] @ 8.5mm	0.9257 [8]	1.49963 [8] 1.49708 [8] $n_{H_\alpha}^{20}$ 1.50573 [8] $n_{H_\beta}^{20}$ 1.46170 [8] $n_{H_\gamma}^{20}$	

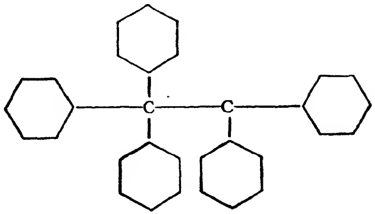
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3,3′-Dicyclopentyldicyclopentyl 		205 to 207 [4] @ 9mm			
$C_{22}H_{38}$ **3,3′-Dicyclohexyldicyclopentyl** 		180 [4] @ 0.1mm	0.9592 [4] @ 18°	1.51290 [4]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3,5-Tricyclohexylcyclohexane 	159 to 160 [2,14] 158 to 159 [5]	228 to 228.5 [2,14] @ 3.5mm			

$C_{26}H_{46}$

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,2,2-Tetracyclohexylethane 	158 to 159 [14]				

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,1,1,2-Tetracyclohexylethane 	112 to 114 [14]		0.9636 [14] D_{25}^{25}	1.5217 [14] @ 25°	$[\alpha]_D^{20} = +25.1°$ [14]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Pentacyclohexylethane 	191 to 192 [14]				

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(11) O. Neunhoffer, Ann. **509**, 115, 1934.
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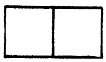
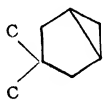
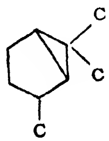
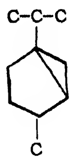
V. BICYCLANES OR BICYCLOPARAFFINS

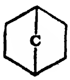
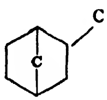
1. Bicyclanes with an alkyl substitution, C_nH_{2n-2}
2. Bicyclanes with an alkenyl or olefin substitution, C_nH_{2n-4}
3. Bicyclanes with two alkenyl or one alkadienyl substitution.

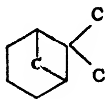
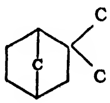
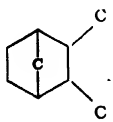
1. BICYCLANES OR BICYCLOPARAFFINS WITH ALKYL SUBSTITUTIONS, C_nH_{2n-2}

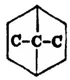
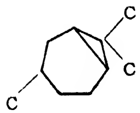
C_6H_{10}

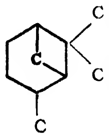
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
[0,1,3]-Bicyclohexane 		78 to 79.5 [117] @ 750mm 80 to 81 [116] @ 748mm	0.8144 [117]	1.4309 [117] @ 21.5° 1.4320 [117] 1.4337 [116] @ 17°	
[0,2,2]-Bicyclohexane 		78.5 to 79.5 [86] @ 732mm	0.8245 [86] @ 19°	1.4475 [86] @ 19°	
C_8H_{14} **5,5-Dimethyl-[0,1,3]$^{(1,3)}$-bicyclohexane** 		115.2 to 115.4 [98] 115 [124] 114.0 to 114.1 [77] @ 740mm	0.8125 [98] 0.7962 [124] 0.7929 [123, 124] 0.7976 [124] D_{20}^{20}	1.4385 [98] 1.4331 [124] 1.4329 [123, 124]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,4-Trimethyl-[0,1,3]$^{(1,3)}$-bicyclo-hexane 		137 to 138 [41] 138.5 to 139 [39] @ 759mm 140.5 [39] @ 752mm	0.8223 [39] D_0^{20}	1.4465 [39] @ 18.5°	
$C_{10}H_{18}$ **4-Methyl-1-isopropyl-[0,1,3]$^{(1,3)}$-bicyclo-hexane** (Thujane) (Tanacetane) 		158 to 159 [114] @ 765mm 157 to 160 [22] 157 to 158 [22] 156 to 157 [18,19] 155 to 156 [18,19] 157 [38] @ 759mm 157 [97] @ 758mm 156.2 to 156.8 [73] @ 756mm 156 to 157 [91] @ 747mm 157.5 to 158 [37] @ 741mm	0.8143 [18] D_{26}^{26} 0.8158 [18,91] D_{21}^{22} 0.8140 [19] @ 22° 0.8181 [22,97] 0.8139 [97] 0.8171 [38] D_0^{20} 0.8161 [37] D_0^{20} 0.8142 [70] @ 19.5° 0.8190 [22,97] @ 17° 0.8191 [97] @ 16° 0.8161 [97] @ 16°	1.440 [18] @ 26° 1.44121 [18,91] @ 22° 1.43939 [73] @ 20.2° 1.4440 [22] 1.4435 [19] 1.4410 [19] 1.4400 [38] 1.4399 [114] 1.4398 [37] 1.43759 [97] 1.44393 [22,97] @ 17° 1.44102 [97] @ 16° 1.43708 [73] $n_{H_\alpha}^{20.2}$ 1.44495 [73] $n_{H_\beta}^{20.2}$ 1.44983 [73] $n_{H_\gamma}^{20.2}$	$[\alpha]_D^{20} = +8.48°$ [19,22]

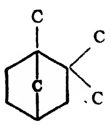
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
[0,1,4]-Bicyclo-heptane (Norcarane) 		111 to 112 [12]	0.8391 [12] @ 23°	1.4544 [12] @ 23°	
[1,2,2]-Bicyclo-heptane (Norbornylane) 	86 to 87 [43]				
C_8H_{14} **2-Methyl-[1,2,2][(1,4)]-bicycloheptane**  I		125 to 126.5 [113] @ 761mm	0.8532 [113] @ 20.5°	1.4535 [113] @ 20.5°	
		124.5 to 126 [113] @ 745mm	0.8561 [113] @ 16.5°	1.4553 [113] @ 16.5°	
II		121 to 123.5 [113] @ 745mm	0.8537 [113] @ 16.5°	1.4545 [113] @ 16°	

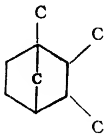
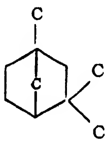
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,2-Dimethyl-[1,1,3]$^{(1,3)}$-bicycloheptane (Nopinane) 		149 [91] @ 747mm	0.8611 [91] D_{22}^{22}	1.46141 [91] @ 22°	
2,2-Dimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane (Camphenilane) 	15 to 16 [64] 17 [44]	142 [44] 142.5 [64] @ 753mm	0.8547 [64] 0.8539 [44]	1.4555 [64] 1.4534 [44]	
2,3-Dimethyl-[1,2,2]$^{(1,4)}$ bicycloheptane (Dihydrosantene) 			0.8712 [10] @ 18.5°	1.4636 [10] @ 18.6°	

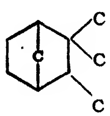
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
7,7-Dimethyl-[1,2,2]-bicycloheptane					
(Apofenchane) 	17 to 17.5 [44]	143.5 [44]	0.8538 [44]	1.45414 [44]	
$C_{10}H_{18}$ **2,2,5-Trimethyl-[0,1,4]$^{(1,3)}$-bicycloheptane**					$[\alpha]_D = -34°$ [91]
(Carane) 		169.5 [40] @ 759mm 165 to 166 [91] @ 750mm 168 to 168.5 [114] @ 748.5mm 162 [20] @ 684mm 105 to 106 [47] @ 116mm 49 to 50 [91] @ 9mm	0.836 [20] D_{26}^{26} 0.8410 [40] D_0^{20} 0.8381 [91] D_{20}^{20}	1.455 [20] @ 26° 1.4551 [114] @ 24° 1.45823 [40, 91] 1.4573 [114] @ 19°	

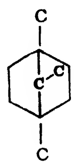
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,2,4-Trimethyl-[1,1,3]$^{(1,3)}$-bicyclo-heptane (Pinane) *d* form 	−45 [99,100]	166 [100] 166 [99] @ 755mm 163 to 164* [55,85,125] @ 720mm	0.8566 [17, 55, 85, 125] 0.861 [99,100] D_{15}^{15}	1.4624 [17, 55, 85, 125]	$[\alpha]_{578} = +23.8°$ [100] $[\alpha]_D = +23.08°$ [55,85,125] $[\alpha]_D = +22.7°$ [99] *Lipp [52] states that he has determined that this is the *cis* isomer of pinane. He also states that the *cis* compound is what Sabatier and Senderens[79] have isolated.

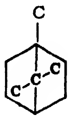
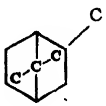
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,4-Trimethyl-[1,1,3]$^{(1,3)}$-bicyclo-heptane					$[\alpha]_D = -1.25°$ [63]
					$[\alpha]_D = -9.58°$ [109]
(Pinane) *l* form	−50 [99]	168 to 168.5 [109]	0.8550 [87] @ 20.5°	1.4620 [55,106]	$[\alpha]_D = -13.3°$ [109]
		166 [85]	0.8567 [109]	1.4605 [109]	$[\alpha]_D = -16.1°$ [55,106]
		164.8 to 165.8 [55]	0.8562 [55,106]	1.4601 [109]	$[\alpha]_D = -17.62°$ [87]
		163.5 to 165 [107] @ 758mm	0.8542 [109]	1.4580 [109]	$[\alpha]_D = -18.9°$ [55,106]
		166 [99] @ 755mm	0.8512 [109]	1.4540 [63]	$[\alpha]_D = -19.84°$ [109]
		163.5 to 165 [109] @ 750mm	0.8390 [63]	1.4648 [107] @ 19°	$[\alpha]_D^{20} = -20.55°$ [107]
		168 to 169 [63] @ 748mm	0.8607 [107] D_{20}^{20}	1.4630 [87] @ 19°	$[\alpha]_D = -21.3°$ [99]
		167.5 to 168 [109] @ 748mm	0.8519 [55,106] @ 17.5°	1.45952 [55] @ 17.5°	
		165.5 to 166 [58] @ 721mm	0.8620 [85] @ 0°	1.4595 [106] @ 17.5°	
		162 to 164 [55,106] @ 720mm			
		162 to 164 [87] @ 719mm			
		164.8 to 165.8 [106] @ 716mm			

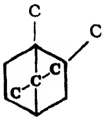
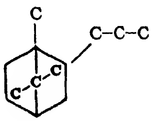
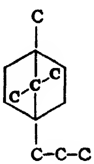
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,4-Trimethyl-[1,1,3]$^{(1,5)}$-bicyclo-heptane					
(Pinane) Unspecified optical activity		169 to 170 [115] @ 768mm 164.5 to 165 [68] @ 763mm 166 to 168 [115] @ 752mm 165 to 169 [69] @ 752mm 165 to 169.5 [69] @ 752mm 168.5 [115] @ 748mm 163.5 to 164 [68] @ 747mm 167 to 167.5 [114] @ 737mm	0.8467 [115] @ 21° 0.8558 [68] 0.8551 [68] 0.8521 [114] 0.8430 [69] 0.8402 [69] 0.8453 [115] @ 18.5° 0.8470 [115] @ 18°	1.4605 [114] @ 21° 1.4554 [115] @ 21° 1.4611 [68] 1.4609 [68] 1.4572 [69] 1.4559 [69] 1.4589 [115] @ 18°	
1,2,2-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane 	116 to 117 [66]				

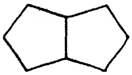
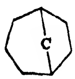
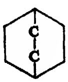
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,3-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane					
(1-Methyldihydrosantene)		159 to 160 [46]	0.8520 [46]		
					
***l*-1,3,3-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane**					$[\alpha]_D = -18.11°$ [104]
					$[\alpha]_D = -18°$ [62]
(Fenchane)		151 to 152 [44] @ 765mm	0.8345 [44]	1.44752 [76]	$[\alpha]_D = -16.53°$ [38]
		151.5 [38] @ 763mm	0.8337 [76]	1.44714 [44]	$[\alpha]_D = -15.22°$ [72]
		145 to 147 [76]	0.8317 [62,65]	1.4463 [38]	
		149.2 to 149.5 [62,65] @ 753mm	0.8316 [104]	1.4462 [104]	
		149 [104] @ 750mm	0.8326 [38]	1.4459 [62,65]	
		149 to 149.3 [47] @ 749mm	D_0^{20} 0.8471 [62] @ 0°		

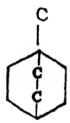
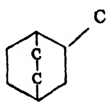
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
d-1,3,3-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane					
(*d-l-α*-Fenchane)		161 to 163 [42] @ 755mm	0.8612 [42]	1.46152 [42] 1.45921 [42] $n_{H_\alpha}^{20}$ 1.46741 [42] $n_{H_\beta}^{20}$ 1.46740 [42] $n_{H_\gamma}^{20}$	
dl-1,3,3-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane					
(*d-l-β*-Fenchane)		158 to 160 [42] @ 752mm	0.8553 [42]	1 45744 [42] 1.45511 [42] $n_{H_\alpha}^{20}$ 1.46304 [42] $n_{H_\beta}^{20}$ 1.47208 [42] $n_{H_\gamma}^{20}$	
2,2,3-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane					$[\alpha]_D = +8.68°$ [54]
(Isocamphane) *d* form 	62 to 63 [54] 61.5 to 63 [54]	166 to 166.5 [54]			

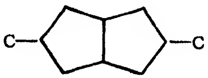
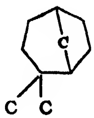
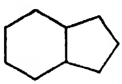
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,3-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane					$[\alpha]_D = -8.5°$ [54]
l form	63 to 64.5 [54]	164 [54] @ 757mm			
2,2,3-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane					
optical activity unspecified	65 to 66 [54] 60 to 61 [108]	163 [54] 164.5 [54] @ 709mm	0.82757 [54] @ 67°	1.44186 [54] @ 67° 1.43982 [54] $n_{H_\alpha}^{67}$ 1.45239 [54] $n_{H_\gamma}^{67}$	
1,4,7-Trimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptane					
(4-Methylsantenane) 		152 to 154 [46]	0.8531 [46]		

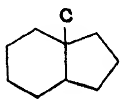
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,7,7-Trimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane					
(Camphane) 	145 [48] 153 to 154 [96,105] 156 to 157 [104,105] 157 to 158 [61] 158 to 159 [38] 151 [114] 151 to 152 [23] 150 [21]	160 to 161 [38] @ 763mm 160 to 161 [96] 161 to 162 [21] 161 [97,105] @ 757mm	0.7458 [48] @ 152 °		
2,7,7-Trimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane					$[\alpha]_D = -12.36°$ [66] $[\alpha]_D = -8.16°$ [114]
(Isobornylane) 		163.5 to 164.5 [65] @ 753mm 162 to 163.5 [114] @ 753mm 162.5 to 163.5 [108] @ 751mm	0.8579 [65] 0.8566 [108,114]	1.4590 [65] 1.4577 [114] 1.4560 [108] 1.4559 [114] @ 19.5°	

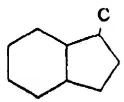
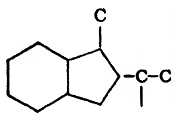
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2,7,7-Tetramethyl-[1,2,2]$^{(1,4)}$-bicycloheptane (?)					
(Methylcamphane) 	138 to 139 [66,67]	170 to 170.5 [66,67] @ 752mm	0.8160 [66] @ 10°	1.46235 [66] @ 16°	
$C_{13}H_{24}$					
1,7,7-Trimethyl-2-propyl-[1,2,2]$^{(1,4)}$-bicycloheptane					
(2-Propylcamphane) 	32 to 32.5 [70]	223 to 223.5 [70]			
1,7,7-Trimethyl-4-propyl-[1,2,2]$^{(1,4)}$-bicycloheptane					
(4-Propylcamphane) 	32 to 32.5 [70]	223 to 223.5 [70]			

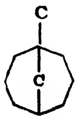
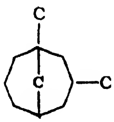
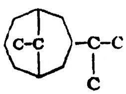
Name and Carbon Skeleton	M. P.,°C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
[0,3,3]-Bicycloöctane *cis* 		127 to 135 [112]	0.8241 [112]	1.4471 [112]	
[0,3,3]-Bicycloöctane *trans*	−30 [4]	132 [4] @ 762mm	0.8626 [6] @ 18° 0.867 [4] @ 14°	1.4625 [6] @ 18° 1.4651 [4] @ 14°	
[1,2,3]-Bicycloöctane 	141 [2]				
[2,2,2]-Bicycloöctane 	168 [41] 169 to 170 [1]				

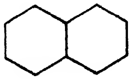
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
[0,*x*,*x*]-Bicyclooctane					
		139.5 to 140.5 [103]	0.8604 [103] 0.8775 [103] @ 0°	1.46148 [103]	
C_9H_{16}					
1-Methyl-[2,2,2]$^{(1,4)}$-bicyclooctane					
		149 to 151 [89]	0.875 [89]	1.46900 [89]	
2-Methyl-[2,2,2]$^{(1,4)}$-bicyclooctane					
	33 to 34 [36]	157 to 158.5 [36] @ 760.8mm	0.8674 [36] @ 40.5°	1.4613 [36] @ 40.5°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
3,7-Dimethyl-[0,3,3]$^{(1,5)}$-bicycloöctane 		165 to 167 [34]	0.8341 [34] @ 24°	1.4481 [34] @ 24°	
5,5-Dimethyl-[1,2,3]$^{(1,4)}$-bicyclooctane (Dihydroendocamphene) 		171.5 to 173 [56]	0.87706 [56] @ 17.4°	1.46847 [56] @ 17.4°	
C_9H_{16} **[0,3,4]-Bicyclononane**			**0.881_9**	**1.471_4**	$\frac{dD}{dt} = -0.0006_4$/°C. (10° to 20°)
(Hydrindane) *cis* 		166 [30] 166 [120] @ 758mm 166 [29] @ 734mm	0.8783 [29] @ 25.1° 0.8815 [30] @ 20.7° 0.880 [30] 0.879 [30] 0.8849 [30] @ 15.3° 0.8872 [30] @ 11.7°	1.4683 [120] 1.4716 [30] 1.4714 [30] 1.4713 [30] 1.47270 [30] @ 16.8° 1.47500 [30] @ 12° 1.46897 [29] $n_{He}^{24.9}$	

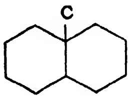
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
[0,3,4]-Bicyclononane					$[\alpha]^{19} = -10.8°$ [4]
l trans		159 [30] 156 [4] @ 747mm	0.8630 [30] 0.865 [4]	1.4655 [4] @ 18.2°	
dl trans		159 to 160 [30] 158 [86]	0.863 [86] 0.8645 [30] @ 18.3°	1.4643 [86] 1.46630 [30] $n_{He}^{14.6}$	
[0,3,4]-Bicyclononane					
(Hydrindane) with no specification of *cis* and *trans* forms		165 to 166 [33] @ 767mm 163.5 to 164.5 [111] 166 to 167 [28,118]	0.8284 [16] @ 81.2° 0.8759 [16] @ 23° 0.8334 [33] 0.8790 [111] @ 15.5° 0.8872 [28] @ 11.7°	1.46897 [4] @ 24.9° 1.4696 [118] 1.46287 [33] 1.4711 [111] @ 15.5° 1.4750 [4,28] @ 12°	
$C_{10}H_{18}$ **cis-1-Methyl-[0,3,4]** $^{(1,5)}$**-bicyclo-nonane**					
(8-Methyl hydrindane) 	12 to 13 [14]	69 @ 19mm [14] 56 [53] @ 10.5mm	0.8778 [14] @ 16° 0.8754 [53] @ 13.5°	1.4707 [14] @ 16° 1.4699 [53] @ 13.5°	

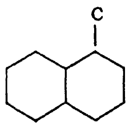
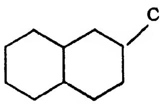
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-[0,3,4]$^{(1,5)}$-bicyclononane					
(8-Methyl hydrindane)		159 to 160 [7] 80 to 82 [5] @ 50mm			
2-Methyl-[0,3,4]$^{(1,5)}$-bicyclononane					
(1-Methyl hydrindane) 		182 to 183 [71]	0.8763 [71]	1.46934 [71]	
$C_{13}H_{24}$ **2-Methyl-3-isopropyl-[0,3,4]$^{(1,5)}$-bicyclononane** 		127 to 137 [11] @ 28mm	0.8715 [11]	1.4660 [11]	

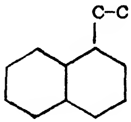
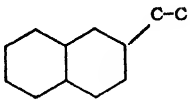
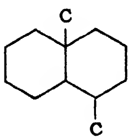
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-[1,3,3]$^{(1,5)}$-bicyclononane 		176 to 178 [77] @ 751mm	0.8416 [77]	1.4529 [77]	
$C_{11}H_{20}$ 1,3-Dimethyl-[1,3,3]$^{(1,5)}$-bicyclononane 		195 to 200 [78] @ 750mm			
$C_{13}H_{24}$ 9-Methyl-3-isopropyl-[1,3,3]$^{(1,5)}$-bicyclononane 		232 to 233 [79] @ 755mm 132 [79] @ 28mm	0.8643 [79]	1.4660 [79]	

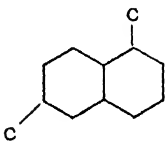
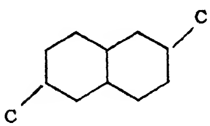
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
[0,4,4]-Bicyclodecane			**0.895_9**	**1.480_8**	
(Decahydronaphthalene) (Decalin)	−43.26 [31,95]	193 [13] @ 768mm	0.898 [24]	1.4773 [75] @ 22.5°	
			0.8963 [95]		
cis	−45 [26]	190.4 to 191.2 [3] @ 764mm	0.8962 [81]	1.4823 [24]	
	−51 [25]		0.8957 [13]	1.48113 [95]	
		190.2 to 190.4 [80] @ 763mm	0.8953 [13]	1.48054 [25]	
			0.8952 [25,119]	1.4805 [27,119]	
		193.8 [81] @ 763mm	0.8951 [3]	1.48035 [3]	
			0.895 [27]	1.4803 [81]	
		194.6 [95]	0.8838 [75]	1.4741 [75]	
		193 [13,25,110,111]	0.8805 [75]	1.48279 [25] @ 19°	
		192 to 193.6 [122]	0.8986 [25] @ 19°	1.4815 [120] @ 17.5°	
		189 to 191 [32]		1.47789 [3] $n^{18}_{H_\alpha}$	
		188 to 192 [75]			
		187 to 188 [49]			
		186 to 190 [75]		1.48638 [3] $n^{18}_{H_\beta}$	
		188.5 to 190.5 [102] @ 717mm		1.49154 [3] $n^{18}_{H_\gamma}$	
		72 [24] @ 12mm		1.48068 [13] n^{20}_{He}	
		68 to 70 [81] @ 12mm			

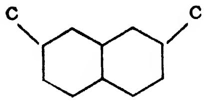
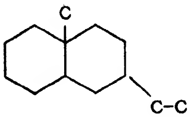
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
[0,4,4]-Bicyclodecane				**1.469_6**	
(*trans*)	−31.47 [95] −33 [26] −36 [25]	185 [13] @ 765mm 187 to 188 [49] 186 to 186.5 [122] 185 [25,27] 184 to 186.5 [121] 182 to 184.5 [75] 185.5 [95] 185 [13] @ 756mm 63 [24] @ 12mm 62 to 63 [81] @ 12mm	0.8641 [26] @ 30° 0.8714 [121] @ 21° 0.8704 [122] @ 21° 0.8715 [25] @ 20.5° 0.8823 [13] 0.8820 [13] 0.877 [49] 0.872 [24] 0.8709 [26] 0.8699 [95] 0.8695 [25] 0.8667 [81] 0.8657 [75] 0.8734 [25] @ 19° 0.8703 [27] @ 18.2° 0.8783 [26] @ 10° 0.893 [49] @ 0°	1.4871 [122] @ 20.5° 1.4713 [24,25] 1.46968 [95] 1.4696 [119] 1.46958 [25] 1.4695 [27,75] 1.4691 [81] 1.4675 [49] 1.46994 [27] @ 18.2° 1.47225 [25] @ 18° 1.46720 [95] $n_{H_\alpha}^{20}$ 1.46728 [27] $n_{H_\alpha}^{18.2}$ 1.47572 [27] $n_{H_\beta}^{18.2}$ 1.48727 [95] $n_{H_\gamma}^{20}$ 1.48060 [27] $n_{H_\gamma}^{18.2}$ 1.47461 [13] n_{He}^{20} 1.47442 [13] n_{He}^{20}	

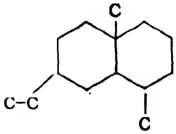
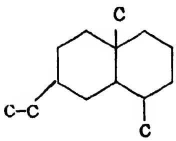
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
[0,4,4]-Bicyclodecane					
cis and *trans*		185 to 193 [34] 188 to 191 [88] 191.6 [15] 195 to 196 [15] 189 to 191 [35] 189 to 190 [74]	0.8609 [15] @ 50° 0.9134 [15] @ 23° 0.8881 [35] 0.884 [17] 0.8833 [15] 0.8781 [34]	1.4965 [15] @ 23° 1.4750 [15] 1.4753 [35] 1.4771 [34] 1.4773 [15] @ 15°	
$C_{11}H_{20}$ ***cis*-1-Methyl-[0,4,4]$^{(1,6)}$-bicyclodecane**					
		82 @ 11mm [24] 79 @ 11mm [53]	0.8909 [24] @ 16.1° 0.8994 [53] @ 12.5°	1.4813 [24] @ 16.1° 1.4844 [53] @ 12.5°	
***trans*-1-Methyl-[0,4,4]$^{(1,6)}$-bicyclodecane**					
		75 @ 14mm [81] 70 to 71 [81] @ 12mm	0.8633 [81] 0.8583 [81] 0.8654 [24] @ 17.6°	1.4631 [81] 1.4702 [81] @ 17.6° 1.4697 [24] @ 17.6°	

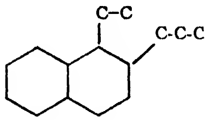
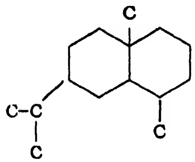
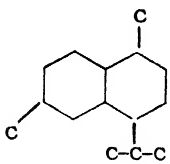
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-[0,4,4]$^{(1,6)}$-bicyclodecane (Mixture of *cis* and *trans* isomers)			0.892 [53]	1.481 [53]	
2-Methyl-[0,4,4]$^{(1,6)}$-bicyclodecane 		205 [101]	0.885 [101] D_{20}^{20}		
***trans*-3-Methyl-0,4,4]$^{(1,6)}$-bicyclodecane** 		78 @ 14mm [4] 76 @ 12mm [81]	0.8670 [81]	1.4681 [81]	
3-Methyl-[0,4,4]-bicyclodecane		201 [101]	0.876 [101] D_{20}^{20}		

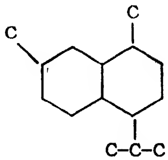
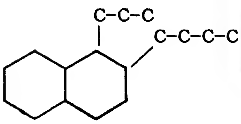
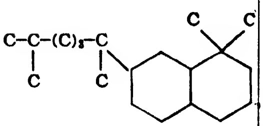
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2-Ethyl-[0,4,4]$^{(1,6)}$-bicyclodecane 		222 [51]	0.8843 [51] @ 23° 0.8985 [51] D_0^0	1.4764 [51] @ 23°	
3-Ethyl-[0,4,4]$^{(1,6)}$-bicyclodecane 		222 [52] 221 [50] 92 @ 13mm [50]	0.8763 [50,52] @ 13.2° 0.8857 [51,52] D_0^0	1.4746 [48,50] @ 13.2°	
***cis*-1,5-Dimethyl-[0,4,4]$^{(1,6)}$-bicyclodecane** 		85 [81,82] @ 12mm 84 to 85 [53] @ 10mm	0.8896 [81,82] 0.8847 [53] @ 16°	1.4812 [81,82] 1.4787 [53] @ 16°	

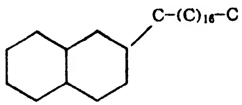
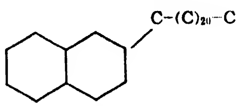
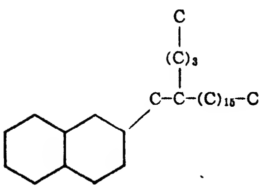
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***trans*-1,5-Dimethyl-[0,4,4]$^{(1,6)}$-bicyclo-decane**		77 to 78 [81] @ 12mm 76 to 78 [53] @ 10mm	0.8633 [81] 0.8544 [53] @ 15°	1.4659 [81] 1.4658 [53] @ 15°	
2,8-Dimethyl-[0,4,4]$^{(1,6)}$-bicyclo-decane 		218 [101]	0.880 [101] D_{20}^{20}		
3,8-Dimethyl-[0,4,4]$^{(1,6)}$-bicyclo-decane 		216 to 217 [9] 208 [101]	0.872 [101] D_{20}^{20}		

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,9-Dimethyl-[0,4,4]$^{(1,6)}$-bicyclodecane 		216 to 218 [9]	0.8518 [119]		
$C_{13}H_{24}$ ***cis*-1-Methyl-4-ethyl-[0,4,4]$^{(1,6)}$-bicyclodecane** 	− 112 [78]	102 to 103 [82] @ 12mm 101 to 102 [83] @ 12mm	0.8912 [83] 0.8903 [82]	1.4819 [82] 1.4811 [83]	$[\alpha]_D^{20} = -0.85$ [83]
***trans*-1-Methyl-4-ethyl-[0,4,4]$^{(1,6)}$-bicyclodecane**		97 to 98 [81] @ 12mm	0.8630 [81]	1.4665 [81]	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***cis*-1,5-Dimethyl-8-ethyl-[0,4,4]$^{(1,6)}$-bicyclodecane** 		115 to 116 [82] @ 12mm	0.8904 [82]	1.4815 [82]	
1,5-Dimethyl-8-ethyl-[0,4,4]-bicyclodecane		112 to 113 [81] @ 14mm	0.8703 [81]	1.4727 [81]	
1,5-Dimethyl-8-ethyl-[0,4,4]$^{(1,6)}$-bicyclo-decane (1,4(a)-Dimethyl-7-ethyldecalin) 		120 to 125 [8] @ 20mm			

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2-Ethyl-3-propyl-[0,4,4]$^{(1,6)}$-bicyclodecane 		79 to 89 [72] @ 2mm	0.8839 [72]	1.4778 [72]	
1,5-Dimethyl-8-isopropyl-[0,4,4]$^{(1,6)}$-bicyclodecane 		126 to 128 [93] @ 10.5mm 122 to 122.5 [94] @ 7.5mm 116 to 117 [94] @ 6.5mm	0.8896 [94] 0.8893 [94] 0.8881 [93] 0.8911 [86]	1.48471 [94] 1.483 [94] 1.48278 [94] 1.48259 [93]	$[\alpha]_D = +11.8°$ [94] $[\alpha]_D = +10.2°$ [94] $[\alpha]_D = +7°$ [90]
2,8-Dimethyl-5-isopropyl-[0,4,4]$^{(1,6)}$-bicyclodecane (Tetrahydrocadinene) 		125 to 128 [90] @ 10mm	0.8838 [90]	1.4805 [90]	$[\alpha]_D = -20°$ [90]

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,9-Dimethyl-5-iso-propyl-[0,4,4]$^{(1,6)}$-bicyclodecane*					$[\alpha]_D = +4.6°$ [90]
(Tetrahydroisozingiberene) 		123 to 123.5 [90] @ 10mm	0.8822 [90]	1.4791 [90]	*Correct structure of this seems to be 2,8-Dimethyl-5-iso-propyl-[0,4,4]$^{(1,6)}$-bicyclodecane. See Simonsen, "The Terpenes," p. 498. Cambridge Press, London (1932).
$C_{17}H_{32}$					
2-Propyl-3-butyl-[0,4,4]$^{(1,6)}$-bicyclodecane 		98 to 100 [72] @ 2mm	0.8796 [72]	1.4790 [72]	
$C_{20}H_{38}$					
2,2-Dimethyl-9-(1,5-dimethylhexyl)-[0,4,4]$^{(1,6)}$-bicyclodecane					
(Hexahydroiso-α-camphorene) 		180 to 186 [92] @ 14mm	0.8588 [92] @ 21°	1.46800 [92]	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Octadecyl-[0,4,4]$^{(1,6)}$-bicyclodecane 	43 to 47 [59,60]		0.863 [59] @ 25° (extrap.)	1.4739 [59] @ 25° (extrap.)	
$C_{32}H_{62}$ **3-Docosyl-[0,4,4]$^{(1,6)}$-bicyclodecane** 			0.8673 [59] @ 25°	1.4759 [59] @ 25°	
3-(2-Butyloctadecyl)-[0,4,4]$^{(1,6)}$-bicyclodecane 		240 to 245 [60] @ 3mm	0.8615 [59] @ 25°	1.4772 [59] @ 25°	

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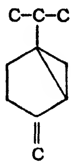
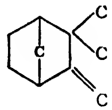
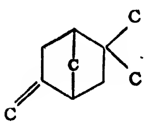
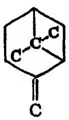
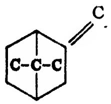
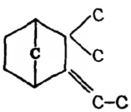
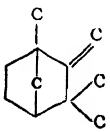
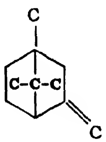
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
d-4-Methylene-1-iso-propyl-[0,1,3](1,3)-bicyclohexane					$[\alpha]_D = +63°$ [48,54] $[\alpha]_D = +80.17°$ [50,64]
(Sabinene) 		163 to 165 [50,54,64] 162 to 166 [48] 163 to 165 [4] @ 757.6mm 66 [36] @ 30mm	0.8430 [36] @ 30° 0.840 [48,54] 0.842 [50,64] 0.8422 [4] @ 17°	1.4660 [36] @ 30° 1.465 [50] 1.466 [48] 1.4678 [64] 1.46738 [4] @ 17° 1.46428 [4] $n_{H_\alpha}^{17}$ 1.47514 [4] $n_{H_\beta}^{17}$ 1.48196 [4] $n_{H_\gamma}^{17}$	$[\alpha]_D = +80.07°$ [36]
l-4-Methylene-1-iso-propyl-[0,1,3](1,3)-bicyclohexane					$[\alpha]_D = -46.19°$ [50] $[\alpha]_D^{15} = -42.5°$
		162 to 166 [1] 161.5 to 163 [50] @ 705mm	0.8407 [50] D_{30}^{30} 0.8468 [1]	1.465 [50] @ 30°	

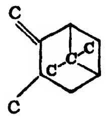
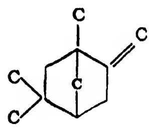
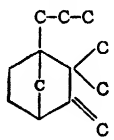
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Methylene-2,2-dimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane			**0.845_0 @ 50°**		$[\alpha]_D^{17} = +103.89°$ [65] $[\alpha]_D^{20} = +74.55°$ [3]
(*d*-Camphene) 	42.7 [53] 43 to 43.5 [3] 46 to 47 [3] 46 [36] 48 [41] 48 to 49 [59] 50 [7,68] 51.2 [21]	160 to 161 [36,59,68] 158 to 158.5 [3] 157 [41] 157.6 [53] @ 745mm 157.2 to 159.9 [3] @ 742mm 160 to 162 [21,60] @ 739.9mm	0.8446 [3] @ 50° 0.8450 [36] @ 50° 0.8456 [7] @ 50° 0.8486 [3] @ 50° 0.850 [60] @ 48°	1.45641 [3] @ 50° 1.4581 [60] @ 48° 1.4533 [7] @ 25° 1.4570 [36] @ 25° 1.46048 [3] $n_{H_a}^{50}$	
			0.854_7 @ 40°		$[\alpha]_D^{20} = -95.7°$ [20]
l-Camphene	39 [68] 44 [32] 45 to 48 [15,41] 49 [20] 50 [15] 51 to 52 [32] 55 [56]	160 to 161 [68] 159 to 160 [15] 158.5 to 159.5 [6] 158.5 to 159 [32] 156 to 157 [41] 158 to 158.8 [4] @ 759mm 157.8 [20] @ 743mm	0.8062 [41] @ 97.7° 0.8211 [41] @ 79.7° 0.83473 [6] @ 63.4° 0.8387 [41] @ 58.9° 0.84224 [6] @ 54° 0.8481 [41] @ 47.7° 0.8555 [68] @ 40°	1.45085 [6] @ 63° 1.45514 [6] @ 54° 1.46207 [68] @ 40°	$[\alpha]_D^{19} = -92.37°$ [15] $[\alpha]_D^{19} = -80.7°$ [32] $[\alpha]_D^{13} = -51.88°$ [41] $[\alpha]_D = -84.9°$ [68] $[\alpha]_D = -80°$ [56] $\frac{dD}{dt} = -0.0008_5/°C.$ (40° to 100°) $\frac{dn}{dt} = -0.0004_9/°C.$ (40° to 65°)

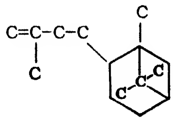
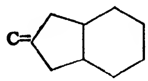
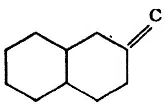
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Methylene-2,2-dimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane (*Continued*)					
dl-Camphene	41 to 42 [2]	160 to 161 [54]	0.8223 [13] @ 78°	1.44115 [13] $n^{78}_{H_\alpha}$	
	44.5 to 46 [58]	160 [18]	0.8524 [38] D^{60}_{60}	1.45061 [13] $n^{78}_{H_\beta}$	
	45 to 46 [30]	159.5 to 160 [2,19]	0.8544 [38] D^{55}_{55}	1.45614 [13] $n^{78}_{H_\gamma}$	
	46 to 47 [2]	159 to 160 [5]	0.8565 [38] D^{50}_{50}		
	48 to 49 [2,16]	158 to 160 [30,58]	0.8586 [38] D^{45}_{45}		
	49 [19]	158 to 159 [2,16]	0.8609 [38] D^{40}_{40}		
	49 to 51 [2]	157 to 157.5 [38] @ 750mm			
	49.5 to 50.5 [2]	156.3 to 156.7 [31] @ 712mm			
	50 [5,31,54]	51 to 53 [37] @ 17mm			
	54 [18]				
***d*-5-Methylene-2,2-dimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane**					$[\alpha]_D = +62.91°$ [39]
					$[\alpha]_D = +62.5°$ [39]
(β-Fenchene) 		151 to 153 [28]	0.8591 [39]	1.4645 [39] @ 23°	
		150.5 to 153.5 [39]	0.8599 [39]	1.4654 [39] @ 18.6°	
		150 to 153 [39]			

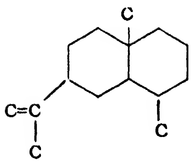
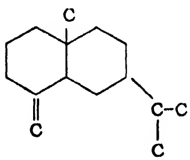
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
5-Methylene-2,2-dimethyl-[1,2,2](1,4)-bicycloheptane		151 to 153 [23,27,28] 152 to 153 [24]	0.8581 [23] 0.8596 [27] 0.8597 [24] 0.8598 [28] @ 17°	1.4644 [23] 1.46511 [24] 1.4658 [27] 1.4662 [28] @ 17°	
l-4-Methylene-7,7-dimethyl-[1,1,3](1,3)-bicycloheptane (Nopinene, β-Pinene) 	About −50 [57]	165.2 [11] 164 to 166 [47] 164 [57] 163 to 165 [54] 162 to 164 [46] 162 to 163 [67] 160 [61] 156 to 157 [51] 164 to 166 [14] @ 758mm 163.5 to 165.5 [70] @ 742mm	0.866 [67] @ 22° 0.869 [46,54] 0.8708 [11] 0.8650 [14] @ 15° 0.8720 [47] @ 15° 0.8740 [12] @ 15° 0.875 [8] @ 15° 0.8758 [51] D_0^0	1.4647 [51] @ 22° 1.4724 [67] @ 22° 1.4766 [70] @ 20.5° 1.47548 [14] 1.4812 [11] 1.478 [8] @ 15° 1.4872 [12] @ 15°	$[\alpha]_D^{22} = -17.19°$ [47] $[\alpha]_D = -22.48°$ [11] $[\alpha]_D = -22.33°$ [67] $[\alpha]_D = -22.1°$ [8] $[\alpha]_D = -19.19°$ [14] $[\alpha]_D = -17.8°$ [46,54] $[\alpha]_D = -16.24°$ [51]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methylene-7,7-dimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane					$[\alpha]_D = -32.3°$ [25]
					$[\alpha]_D^{19.5} = -32.76°$ [39]
(*l*-α-Fenchene)		159 to 162 [54]	0.8616 [33]	1.47092 [39] @ 23.2°	$[\alpha]_D^{18} = -32.12°$ [69]
		157 to 159 [39]	0.865 [54]	1.46876 [39] @ 22.3°	$[\alpha]_D = -4.4°$ [54]
		156 to 157 [69]	0.8664 [39]	1.4642 [33]	$[\alpha]_D = -38°$ [44]
		155 to 160 [25]	0.8675 [39]	1.47085 [39] @ 19.5°	$[\alpha]_D = -39.50°$ [29]
		155 to 158 [29]	0.8677 [29]	1.4724 [69] @ 19°	
		154 to 156 [63]	0.869 [69] @ 19°	1.4693 [63] @ 18°	
		153 to 155.5 [39]	0.866 to 0.867 [63] @ 18°	1.46729 [25] @ 17.5°	
		152 to 157 [33] @ 750mm	0.8670 [25] @ 17.5°	1.4750 [44] @ 13°	
		153 to 154 [44] @ 720mm	0.870 [44] @ 13°		
2-Methylene-7,7-dimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane					$[\alpha]_D^{20} = +12.76°$ [66]
(*d*-α-Fenchene)		155 to 161 [66]	0.8630 [66]	1.4699 [66]	
		140.5 to 142.5 [39] @ 755mm			
2-Methylene-7,7-dimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane					
(*dl*-α-Fenchene)		158 to 160 [62]	0.8660 [23]	1.47045 [23]	
		154 to 156 [23]	0.8656 [23]	1.4708 [23]	
		155 to 157 [23]	0.864 [62]	1.46900 [62]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2-Dimethyl-3-ethylidene-[1,2,2]$^{(1,4)}$-bicycloheptane					$[\alpha]_D = +4.28°$ [30]
(ω-Methylcamphene) 		178 [30] 172 to 173 [71] @ 743mm	0.8638 [71] @ 27° 0.884 to 0.888 [30] @ 15°	1.4643 [71] @ 27°	
2-Methylene-1,3,3-trimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane					
(α-Methylcamphene) 		170.5 to 171 [34] @ 764mm			
3-Methylene-1,7,7-trimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane					
(Methylenecamphane) 	28 [65]	166 to 168 [65] 58 to 62 [42] @ 11mm			

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
6-Methylene-5,7,7-trimethyl-[1,1,3]$^{(1,3)}$-bicycloheptane					$[\alpha]_D^{20} = +0.2420°$ [17]
(Methylpinene)		161 to 164 [17] @ 783mm	0.8363 [17]	1.46362 [17]	
					
2-Methylene-1,5,5-trimethyl-[1,2,2]$^{(1,4)}$-bicycloheptane					
(*dl*-Methyl-β-fenchene)		160 to 162 [22]	0.85205 [22]	1.46261 [22] @ 20.5°	
					
$C_{13}H_{22}$ **3-Methylene-2,2-dimethyl-1-propyl-[1,2,2]$^{(1,4)}$-bicycloheptane**					$[\alpha]_D = -36.71°$ [35]
(β-Propylcamphene)		92 to 93 [35] @ 16mm 86 to 87 [35] @ 12mm	0.87188 [35] 0.8722 [35]	1.4786 [35] 1.4770 [35]	
					

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,7,7-Trimethyl-6-(3-methylbuten-3-yl)-[1,1,3]$^{(1,3)}$-bicycloheptane					$[\alpha]_D = -29.41°$ [9] $[\alpha]_D = -4.97°$ [50]
(γ-Dihydrocaryophyllene) 		126 [10] @ 15mm 124 to 124.5 [9] @ 12.75mm 131 [50] @ 11mm	0.8872 [9] @ 21° 0.8893 [10] @ 18° 0.8965 [50] @ 15°	1.4880 [9] @ 21° 1.4885 [10] @ 18° 1.496 [50] @ 18°	
$C_{10}H_{16}$					
***trans*-8-Methylene-[0,3,4]-bicyclononane**					
(*trans*-2-Methylenehexahydrohydrindene) 		59 to 60 [52] @ 9.5mm	0.8663 [52]	1.4720 [52]	
$C_{11}H_{18}$					
***trans*-3-Methylene-[0,4,4]-bicyclodecane**					
(*trans*-2-Methylenedecalin) 		82 to 82.5 [52] @ 10mm 81 to 83 [55] @ 9mm	0.8897 [46] 0.8928 [55] @ 16°	1.4870 [52,55]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5-Dimethyl-8-isopropenyl-[0,4,4]-bicyclodecane					$[\alpha] = -7°$ [49]
(Dihydroeudesmene) 		132 to 133 [45] @ 15mm 127 [43] @ 12mm 126 to 127 [45] @ 12mm 126 to 130 [49] @ 10mm	0.9067 [49] 0.9075 [45] 0.9080 [45]	1.4876 [49] 1.4972 [45] 1.5043 [45]	
7-Methylene-1-methyl-4-isopropyl-[0,4,4]-bicyclodecane					
(Dihydroselinene) 		138 to 139 [45] @ 12mm	0.8992 [45] @ 24°	1.4878 [45] @ 24°	

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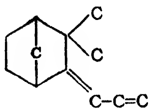
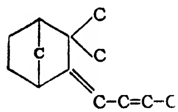
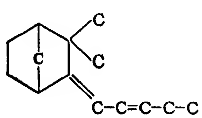
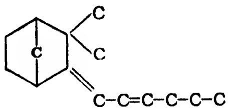
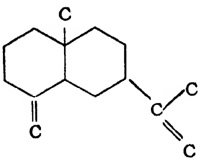
3. BICYCLANES WITH TWO ALKENYL OR ONE ALKADIENYL SUBSTITUTION, C_nH_{2n-6}

$C_{12}H_{18}$

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,2-Dimethyl-3-propen-2-ylidene-[1,2,2]-(1,4)-bicycloheptane (ω-Vinylcamphene) 		203 to 205 [1] 85 to 90 [1] @ 10mm	0.917 [1] 0.921 [1] @ 15°		$[\alpha]_D = +76.39°$ [1]
$C_{13}H_{20}$ **2,2-Dimethyl-3-buten-2-ylidene-[1,2,2](1,4)-bicycloheptane** (ω-Propenylcamphene) 		230 to 232 [1] 95 to 97 [1] @ 12mm	0.919 [1] @ 15°		$[\alpha]_D = +70°$ [1]
$C_{14}H_{22}$ **2,2-Dimethyl-3-penten-2-ylidene-[1,2,2](1,4)-bicycloheptane** (ω-Butenylcamphene) 		238 to 240 [1] 110 to 120 [1] @ 15mm	0.905 [1] @ 15°		$[\alpha]_D = +80°$ [1]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2-Dimethyl-3-hexen-2-ylidene-[1,2,2]$^{(1,4)}$-bicycloheptane					$[\alpha]_D = +73.5°$ [1]
(ω-Pentenylcamphene) 		255 [1] 140 @ 10mm [1]	0.900 [1] @ 15°		
1-Methyl-7-methylene-4-isopropenyl-[0,4,4]$^{(1,6)}$-bicyclodecane					$[\alpha]_D = +34°$ [2] $[\alpha]_D = +31.36°$ [5] $[\alpha]_D = +49.5$ [4]
(β-Selinene) 		268 to 272 [4] 142 to 144 [3] @ 20mm 136 to 139 [5] @ 17mm 135 [2] @ 16mm	0.9107 [5] 0.9140 [2] 0.9196 [4] 0.9232 [4] @ 15° 0.9279 [3] @ 15°	1.50311 [5] 1.5042 [2] 1.5102 [3] @ 15°	$[\alpha]_D = +63°$ [3]

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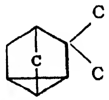
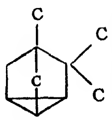
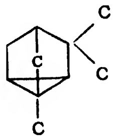
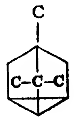
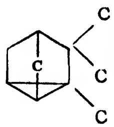
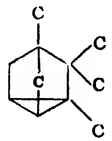
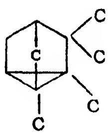
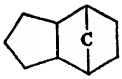
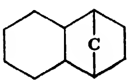
VI. TRICYCLANES, (ENDOCYCLIC), C_nH_{2n-4}

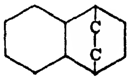
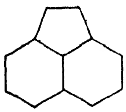
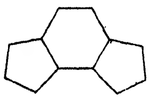
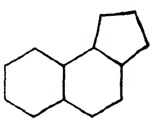
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,2-Dimethyl-1,4-endo-methylene-[0,1,3]$^{(3,5)}$-bi-cyclohexane					
(Apocyclene) 	36.5 to 37.5 [28]	138 to 139 [31] @ 764mm	0.8710 [31] @ 40°	1.45144 [31] @ 40°	
	38.5 to 39.5 [27]	138 to 139.5 [28] @ 763.7mm	0.8717 [27] @ 40°	1.45204 [27] @ 40°	
	39 to 40 [39]	138 to 139 [27] @ 762mm	0.8734 [28] @ 40°	1.45434 [2] @ 40°	
	41 to 42 [28]	137.5 [28] @ 756mm		1.44910 [31] $n_{H_\alpha}^{40}$	
	42.5 to 43 [31]	136.5 to 137 [30] @ 748mm		1.45686 [31] $n_{H_\beta}^{40}$	
				1.46190 [31] $n_{H_\gamma}^{40}$	
$C_{10}H_{16}$ **1,2,2-Trimethyl-1,4-endomethylene-[0,1,3]$^{(3,5)}$-bicyclohexane**					
	116 to 117 [30]	150 to 151 [30]			

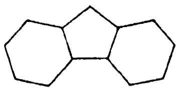
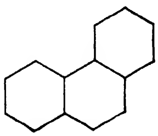
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,2,4-Trimethyl-1,4-endomethylene-[0,1,3]$^{(3,5)}$-bicyclohexane			**0.859$_8$**		$[\alpha]_D^{20} = +3.54°$ [50]
					$[\alpha]_D^{20} = -1.77°$ [44]
(Cyclofenchene)		143 to 143.7 [50] @ 777mm	0.8589 [45] @ 20.4°	1.4503 [50] @ 22°	$[\alpha]_D^{19} = +0.8°$ [50]
		144 [46] @ 770mm	0.8574 [29]	1.45212 [50] @ 20.4°	$[\alpha]_D^{18} = -0.28°$ [50]
		144 to 146 [4]	0.8584 [50]	1.45442 [50] @ 20.2°	$[\alpha]_D = +0.28°$ [2]
		142.8 to 147 [50]	0.8587 [50]	1.44769 [2]	
		141.5 to 143.5 [2]	0.8588 [32]	1.45133 [45]	
		140 to 143 [29]	0.8591 [50]	1.4515 [40]	
		143 to 144 [32] @ 756mm	0.8599 [3]	1.4525 [62]	
		141.5 to 142 [50] @ 755mm	0.8603 [40]	1.4532 [44]	
		143 to 143.5 [40,41] @ 754mm	0.8604 [62]	1.45327 [29]	
		142 to 143 [16,32] @ 752mm	0.8609 [44]	1.45768 [3]	
		143.6 to 143.9 [45] @ 750mm	0.8636 [38]	1.4579 [38]	
		143 [62] @ 749.5mm	0.8624 [16,32] @ 16.5°	1.45364 [16,32] @ 16.5°	
		143 to 143.5 [46] @ 748mm	0.8624 [46] @ 16.4°	1.45370 [46] @ 16.2°	
		143 to 143.5 [44] @ 747.5mm	0.8624 [32] @ 16°	1.45474 [32] @ 16°	
		145 to 149 [38] @ 747mm		1.4547 [32] @ 16°	
				1.45104 [46] $n_{H_\alpha}^{16.2}$	
				1.45231 [32] $n_{H_\alpha}^{16}$	
				1.45968 [46] $n_{H_\beta}^{16.2}$	
				1.46067 [32] $n_{H_\beta}^{16}$	
				1.46449 [46] $n_{H_\gamma}^{16.2}$	
				1.46547 [32] $n_{H_\gamma}^{16}$	

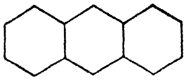
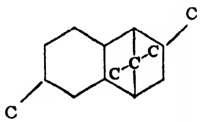
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-1,4-(dimethylendomethylene)-[0,1,3]$^{(3,5)}$-bicyclohexane					
(Isocyclene) (β-Bornylene) 	117.5 [18] 117 to 118 [7] 119 [40,43]	150 to 151 [43] 150 to 152 [7] 151 [40] 150 to 151 [40] 150 to 151 [58] @ 743mm	0.7948 [18,46] @ 120.8°	1.40996 [18] $n_{H_\alpha}^{120.8}$ 1.41743 [18] $n_{H_\beta}^{120.8}$ 1.42195 [18] $n_{H_\gamma}^{120.8}$	
2,2,3-Trimethyl-1,4-endomethylene-[0,1,3]$^{(3,5)}$-bicyclohexane					
(Tricyclene) (Cyclene) 	64 to 65 [29] 64.3 [36] 64.5 to 65 [57] 65 3 [36,37] 65.5 to 66 [41] 66.5 [17] 66.5 to 67 [59] 67 to 68 [13] 67.5 to 67.8 [60]	153 [46] @ 761mm 153.5 [36,37] 153 to 153.5 [57] 152.3 to 153.3 [38] 152 to 152.5 [59] 152.8 to 153 [60] @ 757.5mm 152.5 [17,46] @ 747mm 152 @ 740 mm	0.8268 [18] @ 80 2° 0.8373 [36,37] @ 70° 0.8440 [46] @ 66.0°	1.43890 [36] @ 70° 1.44055 [46] @ 66.9° 1.42963 [18] $n_{H_\alpha}^{80.2}$ 1.43816 [46] $n_{H_\alpha}^{66.9}$ 1.43744 [18] $n_{H_\beta}^{80\ 2}$ 1.44644 [46] $n_{H_\beta}^{66.9}$ 1.44206 [18] $n_{H_\gamma}^{80.2}$	

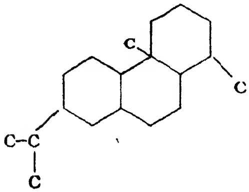
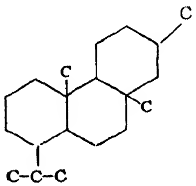
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,2,3-Tetramethyl-1,4-endomethylene-[0,1,3]$^{(3,5)}$-bicyclohexane					
(4-Methyltricyclene) 	109 to 110 [30] 113 to 114 [42]	163.5 to 164.5 [30]			
2,2,3,4-Tetramethyl-1,4-endomethylene-[0,1,3]$^{(3,5)}$-bicyclohexane 	71 to 73 [8]	172 to 175 [8]			

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_{4}	n^{20}_{D}	Additional Data
2,5-Endomethylene-[0,3,4]-bicyclononane					
(low melting isomer) 	9 [16]	191.5 [16] @ 769mm	0.9121 [16] @ 80° 0.9027 [17] @ 79.2° 0.9492 [17] @ 20.8°	1.46705 [17] $n^{79.2}_{H_\alpha}$ 1.49308 [17] $n^{20.8}_{H_\alpha}$ 1.47538 [17] $n^{79.2}_{H_\beta}$ 1.50184 [17] $n^{20.8}_{H_\beta}$ 1.48021 [17] $n^{79.2}_{H_\gamma}$ 1.50706 [17] $n^{20.8}_{H_\gamma}$	
(high melting isomer)	79 [16,56]	193 [16] @ 769mm 123 [16] @ 100mm 118 [16] @ 85mm 101 [16] @ 48mm 86 [16] @ 24mm	0.9120 [16] @ 80° 0.9128 [17] @ 79°	1.47258 [17] $n^{79}_{H_\alpha}$ 1.48101 [17] $n^{79}_{H_\beta}$ 1.48592 [17] $n^{79}_{H_\gamma}$	
$C_{11}H_{18}$ **2,5-Endomethylene-[0,4,4]-bicyclodecane** (1,4-Endomethylene decalin) 		91 @ 22mm [13] 84 to 85 [13] @ 15mm			

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,5-Endoethylene-[0,4,4]-bicyclodecane 			0.9675[6] @ 22°	1.5042[6] @ 22° 1.5015[6] $n^{22}_{H_\alpha}$	
Decahydroacenaphthene 		235 to 237[25] 235 to 236[34] 235[21] 230 to 234[23]	0.9488[25] @ 25° 0.9370[23] @ 0°	1.4996[25] @ 25°	
4,5-Cyclopentano-[0,3,4]-bicyclononane 		106 to 108[47] @ 18mm	0.9145[47]	1.4840[47]	
$C_{13}H_{22}$ **2,3-Cyclopentano-[0,4,4]-bicyclodecane** (1,2-Cyclopentano-decahydronaphthalene) 		71 to 72[48] @ 2.5mm	0.9241[48]	1.4895[48]	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
7,8-Cyclohexano-[0,3,4]-bicyclononane (Dodecahydrofluorene) 		254 to 258 [23]	0.9496 [23] @ 0°		
$C_{14}H_{24}$ **2,3-Cyclohexano-[0,4,4]-bicyclodecane** (Perhydrophenanthrene) 	− 3 [34]	270 to 275 [34] 275 to 276 [11] @ 754.3mm 274 to 277 [51] @ 739mm 156 [15] @ 26mm 147 to 149 [14] @ 20mm 150 to 160 [25] @ 18mm 142 to 144 [14] @ 15mm 135 [15] @ 13mm 131 [15] @ 10mm 93 to 96 [48] @ 2.5mm 90 to 93 [48] @ 2.5mm 86 to 89 [48] @ 2mm	0.9630 [25] @ 25° 0.9609 [25] @ 25° 0.9385 [48] 0.9437 [48] 0.9447 [48] 0.933 [34] D_{20}^{20} 0.9503 [11] @ 16°	1.5003 [15] @ 25° 1.5261 [34] @ 25° 1.5323 [34] @ 25° 1.4994 [48] 1.5011 [48] 1.5019 [48] 1.5035 [14] 1.5050 [14] 1.5060 [11] @ 16°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,4-Cyclohexano-[0,4,4]-bicyclodecane (Perhydroanthracene) 	60.5 to 61 [25] 61 to 62 [10] 88 to 89 [24] 88 [19,20,26,35] 90 to 90.5 [37] 93 [22]	272 to 277 [24] 270 [20] ca. 270 [35] 150 to 155 [25] @ 13mm 128 [22] @ 11mm	0.9747 [25] @ 25°	1.5275 [25] @ 25°	
$C_{15}H_{26}$ **3,8-Dimethyl-2,5-(dimethylendomethylene)-[0,4,4]-bicyclodecane** (Dihydrocedrene) 		118 to 124 [12] @ 12mm 122 to 123 [54] @ 10mm 116 to 122 [52] @ 10mm 109 to 112 [12] @ 10mm 119 to 120 [53] @ 8mm	0.9041 [12] 0.907 [12] 0.9204 [54] 0.9247 [42] 0.9052 [52] @ 15°	1.48719 [12] 1.48721 [52] 1.4882 [12] 1.49204 [53] 1.4929 [54]	$[\alpha]_D^{20} = +2°$ [54] $[\alpha]_D = +33.10°$ [12]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-8-isopropyl-2,3-(4-methylcyclo-hexano)-[0,4,4]-bicyclo decane					$[\alpha]_D = +18.08°$ [49] $[\alpha]_D = +19.00°$ [61]
(Fichtelite) 	46 [9,23] 46.5 [1,61] 48 [55]	355 [23] 355.2 [5] @ 719mm 235.6 [5] @ 43mm 233.6 [5] @ 42mm			
$C_{20}H_{36}$ **1,3-Dimethyl-7-iso-propyl-2,3-(3-methyl-cyclohexano)-[0,4,4]-bicyclodecane**					$[\alpha]_D^{15} = +10.59°$ [58]
(Tetrahydrosciadopitene) 		175 to 176 [58] @ 6mm 170 to 171 [58] @ 5mm	0.9751 [58] @ 15° 0.9761 [58] D_{15}^{15}	1.5278 [58]	

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(60) G. Wagner, S. Moycho, and F. Zienkowski, Ber. **37,** 1032, **1904.**
(61) P. Walden, Chem. Z. **30,** 391, **1906.**
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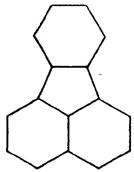
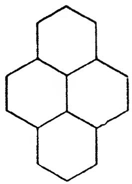
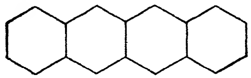
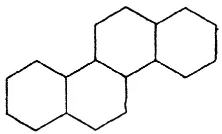
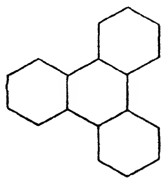
VII. POLYCYCLANES OR POLYCYCLOPARAFFINS

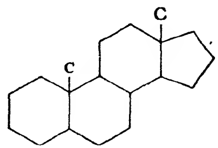
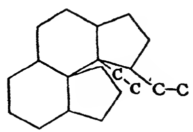
1. Polycyclanes with alkyl substitutions, C_nH_{2n-6}
2. Polycyclanes with an alkenyl or olefin substitution, C_nH_{2n-8}

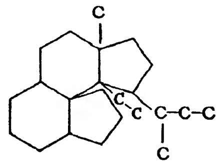
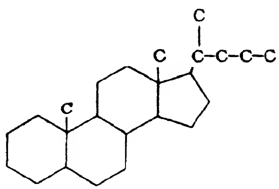
1. POLYCYCLANES OR POLYCYCLOPARAFFINS WITH ALKYL SUBSTITUTIONS, C_nH_{2n-6}

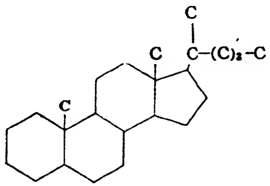
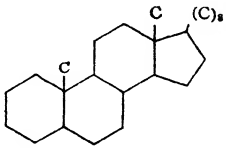
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Perhydrofluoranthene 		168 to 170 [2] @ 12mm	0.9811 [2] @ 22°		
Perhydropyrene 	87.8 [9]	162 to 166 [9] @ 9.5mm	0.9828 [9] @ 25°	1.5228 [9] @ 25°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Perhydronaphthacene (3,4,8,9-Dicyclohexano-[0,4,4]-bicyclodecane) 	ca. 50 [1]				
Perhydrochrysene (4,5,9,10-Dicyclohexano-[0,4,4]-bicyclodecane) 	< −20 [16] 115 [10]	359 to 360 [16] @ 771mm 353 [10]	0.9827 [16]	1.52412 [16] @ 17°	

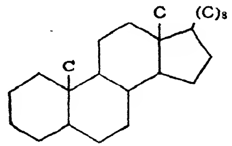
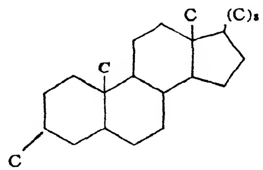
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Perhydrotriphenylene (Perhydro-9,10-benzophenanthrene) (2,3,4,5)-Dicyclohexano-[0,4,4]-bicyclodecane from lignin 		200 to 208 [14] @ 17mm	0.9512 [14] @ 19.2°	1.50776 [14] n_{He}^{20} 1.50510 [14] $n_{H_\alpha}^{20}$ 1.51493 [14] $n_{H_\beta}^{20}$ 1.52080 [14] $n_{H_\gamma}^{20}$	
from synthesis		200 to 201.5 [14] @ 20mm 175 to 176 [16] @ 7mm	0.9425 [15] 0.9468 [14] @ 19.2°	1.50693 [14] n_{He}^{20} 1.50432 [14] $n_{H_\alpha}^{20}$ 1.51382 [14] $n_{H_\beta}^{20}$ 1.51959 [14] $n_{H_\gamma}^{20}$	

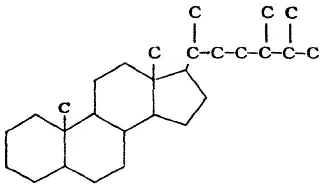
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Androstane 	49 to 50 [4] 49 to 51 [12]				
$C_{20}H_{34}$ **Pregnane*** 	83.5 [3]		1.0319 [3] @ 15°	1.556 [3]	$[\alpha]_D = +19.9°$ [3] *Melting point was determined on one preparation. Remaining constants were determined on another preparation.

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Norcholane† 	101 to 103 [21]				†The following structures are given by ref. (8) and (22) for these compounds.
$C_{24}H_{42}$ **Cholane** 	90 [20]				

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Homocholane 	75 [20]				Tentative structure as given by F. C. Whitmore, "Organic Chemistry," Van Nostrand Co., Inc., New York, 1937.
$C_{27}H_{48}$					
Cholestane 	81 [5] 80 [22] 78 to 79 [17] 71 [18]	269 to 271 [11] @ 12mm			$[\alpha]_D^{28} = +22.5°$ [17] $[\alpha]_D = +25.46°$ [18] $[\alpha]_D^{15} = +43.32°$ [11]

$C_{28}H_{50}$

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Pseudocholestane 	70 to 71 [19] 69 [22]				
3-Methylcholestane 	96 to 97 [7]				

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Ergostane 	101 to 102 [13] 82 [6] 81 to 82 [8]				$[\alpha]_D^{18} = +22.9°$ [8]

(1) J. v. Braun and O. Bayer, Gen. Aniline Works, Inc., New York, A. P. **1, 751, 670**, **1930.**
(2) J. v. Braun and G. Manz, Ber. **63**, 2608, **1930.**
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(4) A. Butenandt and K. Tscherning, Z. physiol. Chem. **229**, 85, **1934.**
(5) H. Dieterle and A. Salomon, Arch. Pharm. **270**, 495, **1932.**
(6) J. L. Dunn, I. M. Heilbron, R. F. Phipers, K. M. Samant, and F. S. Spring, J. Chem. Soc. **1934**, 1576.
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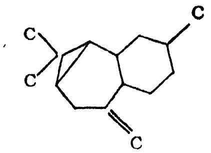
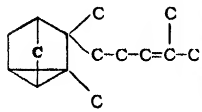
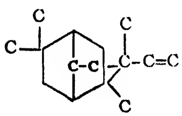
(10) C. Liebermann and L. Spiegel, Ber. **22**, 135, **1889.**
(11) F. F. Nord, Biochem. Z. **99**, 261, **1919.**
(12) T. Reichstein, Helv. Chim. Acta **19**, 979, **1936.**
(13) F. Reindel and E. Walter, Ann. **460**, 212, **1928.**
(14) W. Schrauth, Z. angew. Chem. **36**, 571, **1923.**
(15) W. Schrauth and K. Görig, Ber. **56**, 2024, **1923.**
(16) A. Spilker, Z. angew. Chem. **48**, 368, **1935.**
(17) H. E. Stavely and W. Bergmann, J. Org. Chem. **1**, 567, **1937.**
(18) W. Steinkopf, J. prakt. Chem. [2] **100**, 65, **1920.**
(19) H. Wieland and R. Jacobi, Ber. **59**, 2064, **1926.**
(20) H. Wieland, O. Schlichting, and W. Langsdorff, Z. physiol. Chem. **161**, 80, **1926.**
(21) H. Wieland and V. Wiedersheim, Z. physiol. Chem. **186**, 229, **1930.**
(22) A. Windaus, Ber. **52**, 170, **1919.**

2. POLYCYCLANES WITH AN ALKENYL OR OLEFIN SUBSTITUTION, C_nH_{2n-6}

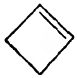
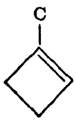
$C_{15}H_{24}$

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Ledene 		255 [2] 264 [5] @ 752mm 139 to 142 [4] @ 10mm	0.9233 [3] 0.9237 [5] @ 19° 0.9349 [5] @ 0°	1.50273 [3] 1.5050 [4]	
α-Santalene 		253 to 254 [1] 252 [6] @ 753mm 118 [6] @ 7mm	0.9132 [6] @ 15° 0.9134 [1] @ 0°	1.49205 [6] @ 15°	
Longifolene 		254 to 256 [7] @ 706mm 150 to 151 [7] @ 36mm	0.9284 [7] D_{30}^{30}	1.495 [7] @ 30°	$[\alpha]_D = +42.73°$ [7]

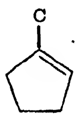
(1) M. Guerbet, Compt. rend. **130,** 1324, **1900.**
(2) E. Hjelt, Ber. **28,** 3087, **1895.**
(3) G. Komppa, Kgl. Norske Videnskab Selskabs, Skrifter **1933,** 1.
(4) K. Ono, Mem. Coll. Sci. Kyoto, **8,** [A], 1, **1925.**
(5) Rizza, J. Russ. Phys. Chem. Soc. **19,** 324, **1887.**
(6) Schimmel and Co., Oct. **1910,** 106.
(7) J. L. Simonsen, J. Chem. Soc. **117,** 570, **1920.**

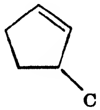
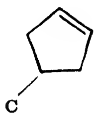
VIII. CYCLENES OR CYCLOÖLEFINS

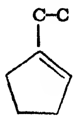
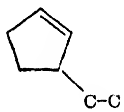
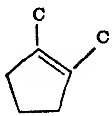
1. Cyclenes with alkyl substitutions, C_nH_{2n-2}
2. Cyclenes with an alkenyl or olefin substitution, C_nH_{2n-4}
3. Cyclenes with two alkenyl or one alkadienyl substitution, C_nH_{2n-6}
4. Cyclenes with an alkene-alkyne or an alkatriene substitution, C_nH_{2n-8}

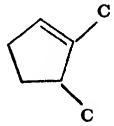
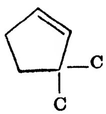
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclobutene 		1.5 to 2 [4] @ 729mm	0.733 [4] @ 0°		
C_5H_8 **1-Methylcyclobutene-1** 		37 to 39 [2,3] 37 to 38 [1] @ 750mm	0.7075 [2] @ 23°	1.4034 [2] @ 23°	

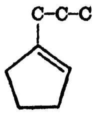
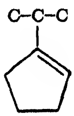
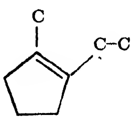
(1) A. Favorsky and V. Batalin, J. Russ, Phys. Chem. Soc. **46**, 726, 1914.
(2) O. Philipow, J. Russ. Phys. Chem. Soc. **45**, 1464, 1913.
(3) O. Philipow, J. prakt. Chem. **93**, 162, 1916.
(4) R. Willstätter and J. Bruce, Ber. **40**, 3979, 1907.

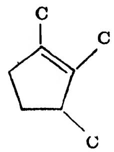
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopentene		**44.4**	**0.772$_1$**	**1.422$_4$**	$\frac{dD}{dt} = -0.0009_6$/°C. (5° to 20°)
		44 to 45 [27] @ 763mm 44.3 [61] @ 761mm 45 to 46 [44,63] 45 [24,25] 44.02 [11] 43.6 to 43.8 [2] 44.1 to 44.6 [50] @ 752mm 43 to 44.2 [23] @ 751mm	0.7716 [11] 0.7736 [61] 0.776 [2] 0.7743 [50] @ 18° 0.7753 [61] @ 17.9° 0.7756 [61] @ 17.2° 0.7754 [31] @ 14° 0.7783 [26,27] $D_{13.5}^{13.5}$ 0.7776 [23] @ 10° 0.7861 [2] @ 7.1° 0.7864 [2] @ 6.75°	1.42246 [61] 1.4247 [2] 1.4420 [11] 1.42183 [50] @ 18° 1.42080 [31] @ 14° 1.4256 [26,27] @ 13.5° 1.4287 [23] @ 10° 1.43052 [2] @ 7.1° 1.42818 [2] $n_{H_\alpha}^{7.1}$ 1.43746 [2] $n_{H_\beta}^{7.1}$ 1.44306 [2] $n_{H_\gamma}^{7.1}$	$\frac{dn}{dt} = -0.0005_4$/°C. (5° to 20°)
C_6H_{10} **1-Methyl-cyclopentene-1**		**75.1**	**0.778$_0$**		$\frac{dD}{dt} = -0.0009_9$/°C. (0° to 25°)
	−127.2 [16]	75.5 to 76 [16] 75 to 76 [13] 72 to 75 [45] 72 [41,42] @ 754mm 71 [26] @ 743mm	0.7754 [45] D_{20}^{23} 0.7474 [26] @ 21° 0.7758 [42] D_0^{20} 0.7918 [26,27] $D_{13.5}^{13.5}$ 0.7979 [16] @ 0° 0.7879 [42] D_0^0	1.4347 [16] @ 15° 1.4309 [26,27] @ 13.5° 1.4319 [16] $n_{H_\alpha}^{15}$ 1.4416 [16] $n_{H_\beta}^{15}$ 1.4512 [16] $n_{H_\gamma}^{15}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
d-3-Methyl-cyclopentene-1 		66.5 to 67 [28] @ 766mm 69 [69] @ 765mm 69 to 71 [41]	0.7663 [69] @ 18° 0.772 [28] @ 16°	1.4222 [69] @ 18° 1.4250 [28] @ 16°	$[\alpha]_D = +59.07°$ [69] $[\alpha]_{579} = +77.90°$ [28]
dl-3-Methyl-cyclopentene-1		72 [61] @ 772mm 66.5 to 67 [28] @ 766mm 69 to 71 [55]	0.7851 [55] 0.7705 [61] @ 20.0° 0.7715 [61] @ 18.9° 0.769 [28] @ 16°	1.42476 [61] 1.4201 [55] 1.4233 [28] @ 16° 1.42214 [61] $n_{H_\alpha}^{20}$ 1.43120 [61] $n_{H_\beta}^{20}$ 1.43573 [61] $n_{H_\gamma}^{20}$	
4-Methyl-cyclopentene-1 		75 to 76 [28] @ 766mm	0.784 [28] @ 16°	1.4346 [28] @ 16°	

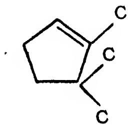
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Ethylcyclopentene-1		108			
	− 123.3[15]	109[33] 107 to 110[67] 106.5 to 107[15]	0.8000[15] 0.792[33] 0.7975[67] 0.8041[15] @ 15°	1.4429[15] @ 21.4° 1.4424[33] 1.4426[67] 1.4402[15] $n^{21.5}_{H_\alpha}$ 1.4497[15] $n^{21.5}_{H_\beta}$	
3-Ethylcyclopentene-1					
		99 to 103[9] @ 758mm	0.7874[9]	1.43030[9]	
1,2-Dimethylcyclopentene-1			0.795_1		$\frac{dD}{dt} = -0.0009_0$/°C. (0° to 30°)
	− 90.4[14] − 91.3[20]	105.03[20] 105 to 105.2[14] 103[34] 103 to 103.5[35] @ 757mm	0.78612[20] @ 30° 0.79501[20] 0.7952[14] 0.7923[34,35] D_0^{20} 0.7998[14] @ 15° 0.79948[20] @ 15° 0.7992[35] $D_0^{13.5}$ 0.81283[20] @ 0°	1.4447[34,35] @ 13.5° 1.4412[14] $n^{20}_{H_\alpha}$ 1.44139[20] $n^{20}_{H_\alpha}$ 1.45115[14] $n^{20}_{H_\alpha}$ 1.45142[20] $n^{20}_{H_\beta}$ 1.4571[14] $n^{20}_{H_\gamma}$ 1.45717[20] $n^{20}_{H_\gamma}$	

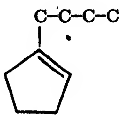
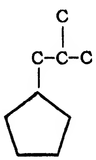
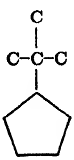
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,3-Dimethylcyclopentene-1			**0.780₅**		$\frac{dD}{dt} = -0.0009_0$/°C. (0° to 30°)
	−124.8 [14] −118.1 [20]	96 to 97 [14] 95.48 to 95.50 [20]	0.77155 [20] @ 30° 0.7831 [14] 0.78055 [20] 0.78512 [20] @ 15° 0.79855 [20] @ 0°	1.43030 [20] $n^{20}_{H_\alpha}$ 1.4321 [14] $n^{20}_{H_\alpha}$ 1.43972 [20] $n^{20}_{H_\beta}$ 1.44153 [14] $n^{20}_{H_\beta}$ 1.44508 [20] $n^{20}_{H_\gamma}$ 1.44724 [14] $n^{20}_{H_\gamma}$	
3,3-Dimethylcyclopentene-1					
		78 to 78.5 [36] @ 754mm	0.7580 [36] D_0^{20}	1.4190 [36]	

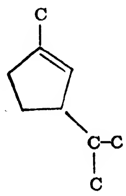
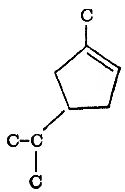
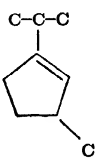
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Propylcyclo-pentene-1 	−100.3 [15]	131.5 to 132.5 [15] 131 to 133 [24]	0.8015 [15] 0.8062 [24] 0.8056 [15] @ 15°	1.4450 [15] 1.4423 [15] $n_{H_\alpha}^{20}$ 1.4516 [15] $n_{H_\beta}^{20}$ 1.4574 [15] $n_{H_\gamma}^{20}$	
1-Isopropylcyclo-pentene-1 		131.4 to 133.4 [43] 133 to 135 [24] @ 755mm	0.8141 [43]	1.45064 [43]	
1-Methyl-2-ethyl-cyclopentene-1 		127.4 to 127.8 [17]	0.8020 [17] 0.8190 [17] @ 0°	1.4490 [17] 1.4452 [17] $n_{H_\alpha}^{20}$ 1.4549 [17] $n_{H_\beta}^{20}$ 1.4608 [17] $n_{H_\gamma}^{20}$	$\frac{dD}{dt} = -0.0008_5/°C.$ (0° to 20°)

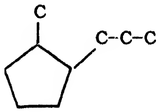
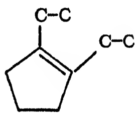
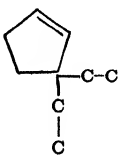
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
d-1,2,3-Trimethyl-cyclopentene-1		**121**	**0.796_9**		$[\alpha]_D^{17.5} = +19.9°$ [59]
					$[\alpha]_D^{26.2} = +28.15°$ [47]
(Laurolene)		122 to 123 [70]	0.7939 [21] D_{25}^{25}	1.4466 [70] @ 18°	$[\alpha]_D^{23} = +22.8°$ [46]
		121 to 122 [59]	0.7974 [21] D_{20}^{20}	1.44376 [59] @ 17.5°	$[\alpha]_D^{15} = +23.6°$ [46]
		119 to 120.5 [21]	0.7991 [47] D_{20}^{20}	1.44253 [21] $n_{H_\alpha}^{19.5}$	$[\alpha]_D = +22.9°$ [70]
		120.3 to 121 [47] @ 750mm	0.79650 [21] @ 19.5°	1.45246 [21] $n_{H_\beta}^{19.5}$	$\frac{dD}{dt} = -0.0008^4$/°C. (5° to 25°)
			0.7988 [70] @ 18.5°	1.45845 [21] $n_{H_\gamma}^{19.5}$	
			0.8008 [59] @ 17.5°		
			0.8010 [21] D_{15}^{15}		
			0.8030 [46] @ 15°		
			0.8048 [21] D_{10}^{10}		
			0.8097 [21] @ 4°		

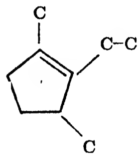
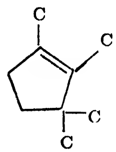
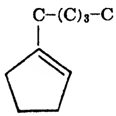
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
l-1,2,3-Trimethyl-cyclopentene-1 (Laurolene)		119 [1] 118 to 122 [49]	0.7871 [49] @ 25° 0.7923 [49] 0.80187 [1] @ 18.6° 0.798 [62] @ 16° 0.8043 [46] @ 15°	1.44315 [49] @ 25° 1.44426 [49] @ 25° 1.4479 [1] @ 18° 1.43972 [49] $n_{H_\alpha}^{25}$ 1.44121 [49] $n_{H_\alpha}^{25}$ 1.44988 [49] $n_{H_\beta}^{25}$ 1.45099 [49] $n_{H_\beta}^{25}$ 1.45555 [49] $n_{H_\gamma}^{25}$ 1.45695 [49] $n_{H_\gamma}^{25}$	$[\alpha]_D^{20} = -14.5°$ [46] $[\alpha]_D^{29} = -15.72°$ [47] $[\alpha]_D^{27} = -18.13°$ [47] $[\alpha]_D = -29.2°$ [62] $\frac{dD}{dt} = -0.0006_8$/°C. (15° to 20°)
1,2,3-Trimethyl-cyclopentene-1 (Laurolene) (Inactive)		120 to 122 [48] 120 to 121 [70] @ 752mm	0.7950 [70] 0.8039 [48] @ 15° 0.8030 [48] @ 15°	1.4421 [70] 1.4464 [48] @ 16.5° 1.4471 [48] @ 16.5°	

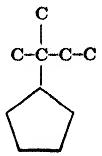
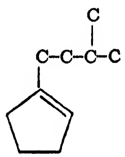
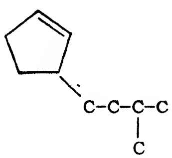
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
2,3,3-Trimethyl-cyclopentene-1 (Isolaurolene) 		**108.5** 109.2 [40] 108 to 110 [22] 108 [2] 108.5 [5] @ 758mm 108.5 to 109 [37] @ 754mm 108 to 108.2 [21] @ 742mm 109.2 [70] @ 736mm 108 to 108.2 [71] @ 736mm	**0.783_8** 0.7795 [21] D^{25}_{25} 0.7830 [21] D^{20}_{20} 0.7824 [37] D^{20}_0 0.782 [2] 0.7812 [70,71] 0.78510 [21] @ 16.1° 0.7955 [40] @ 15° 0.7868 [37] D^{15}_0 0.7867 [21] D^{15}_{15} 0.7871 [37] D^{15}_{15} 0.7949 [22] @ 11.5° 0.7907 [21] D^{10}_{10} 0.7953 [21] @ 4°	**1.433** 1.4333 [70,71] 1.4324 [37] 1.43227 [21] $n^{16.1}_{H_\alpha}$ 1.44136 [21] $n^{16.1}_{H_\beta}$ 1.44690 [21] $n^{16.1}_{H_\gamma}$	$\frac{dD}{dt} = -0.0007_6$/°C. (0° to 25°)

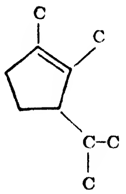
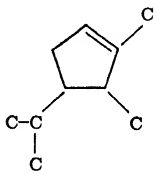
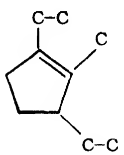
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
1-Butylcyclopentene-1 	−95.75 [16]	157.5 to 158 [15]	0.8101 [15] @ 17.8° 0.8123 [15] @ 15°	1.4488 [15] @ 21.3° 1.4461 [15] $n^{21.2}_{H_\alpha}$ 1.4554 [15] $n^{21.2}_{H_\beta}$ 1.4610 [15] $n^{21.2}_{H_\gamma}$	
Isobutylcyclopentene-*x* 		87 to 88 [24] @ 20mm	0.8203 [24]	1.46046 [24] n^{20}_{He}	
2-Methyl-(2-cyclopenten-*x*-yl)-propane (*tert*-Butylcyclopentene-*x*) 		139.6 [51]	0.7861 [51] @ 40° 0.8021 [51]	1.4417 [51]	

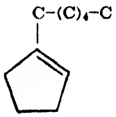
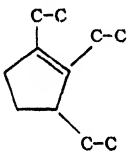
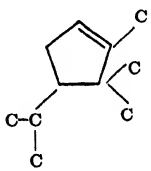
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-3-isopropyl-cyclopentene-1 		144 to 146 [56]	0.801 [56]	1.4478 [56]	
***d*-1-Methyl-4-iso-propylcyclopentene-1** (Apofenene) 		143 [7] 142 to 143 [63]	0.7945 [63] @ 21° 0.812 [7] @ 0°	1.4403 [63] @ 21°	$[\alpha]_D = +66.21°$ [63]
3-Methyl-1-isopropyl-cyclopentene-1 		138 to 139 [66] 136 to 138 [8] 39 to 41 [8] @ 16mm	0.791 [66] @ 22°	1.4380 [66] @ 22°	

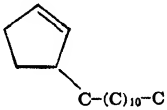
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-2-propyl-cyclopentene-*x* 	−130 [19]	150.15 to 150.25 [19]	0.8059 [19] 0.8223 [19] @ 0°	1.4497 [19] 1.4468 [19] $n_{H_\alpha}^{20}$ 1.4566 [19] $n_{H_\beta}^{20}$ 1.4623 [19] $n_{H_\gamma}^{20}$	
1,2-Diethyl-cyclopentene-1 	−120 [18]	148 to 149 [12] @ 761mm 149.20 to 149.30 [18] 151 to 152 [39] @ 751mm	0.8136 [12] @ 25° 0.8088 [18] 0.8124 [38] D_0^{20} 0.8331 [12] @ 0° 0.8252 [18] @ 0°	1.4512 [18] 1.4524 [38] 1.4484 [18] $n_{H_\alpha}^{20}$ 1.4582 [18] $n_{H_\beta}^{20}$ 1.4640 [18] $n_{H_\gamma}^{20}$	
3,3-Diethylcyclo-pentene-1 		144 to 146 [38] @ 761mm 143.5 to 144.5 [38,39] @ 754mm	0.8083 [38] D_0^{20} 0.8084 [38,39] D_0^{20}	1.4469 [38] 1.4455 [38,39]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Dimethyl-2-ethyl-cyclopentene-1 		140 [2]	0.803 [2]	1.447 [2] $n_{H_\alpha}^{20}$	
1,2,3,3-Tetramethyl-cyclopentene-1 (Campholene*) 		133 to 135 [58] 132 [6] 129 to 130.5 [57] 135.5 [3] @ 755mm	0.8034 [58] 0.8035 [6] @ 15° 0.8034 [57] @ 14.5° 0.8134 [3] @ 0°	1.44406 [58] 1.4446 [6] 1.4445 [57] @ 14.5°	*Investigators do not agree concerning this structure for campholene.
$C_{10}H_{18}$ **1-Pentylcyclopentene-1** 		178 to 180 [53]			

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,1-Dimethylpropyl-cyclopentene-*x*					
(*tert*-Pentylcyclopentene-*x*) 		163 to 165 [51] @ 743mm	0.8256 [51]	1.4548 [51]	
1-(3-Methylbutyl)-cyclopentene-1					
		168 to 170 [32]	0.8010 [32] @ 25°	1.4467 [32] @ 25°	
3-(3-Methylbutyl)-cyclopentene-1					
		86 to 87 [9] @ 59mm	0.7969 [9] @ 22°		

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
l-1,2-Dimethyl-3-isopropylcyclopentene-1 		156 to 156.6 [52] @ 757.5mm 46.2 to 47 [52] @ 15mm	0.811 [52] @ 15°	1.447 [52] @ 17.6°	$[\alpha]_D^{17.6} = -2.0°$ [52]
2,3-Dimethyl-4-isopropylcyclopentene-1 		164 to 166 [64] 163 to 165 [64] 161 to 164 [64] 157 to 159 [60] @ 750mm	0.8085 [64] @ 22° 0.8100 [64] D_{21}^{21} 0.8046 [60] 0.8100 [64] @ 18.5°	1.4503 [64] @ 22° 1.4466 [64] @ 21° 1.44591 [60] 1.4514 [64] @ 18.5°	
2-Methyl-1,3-diethylcyclopentene-1* 		164 [2]	0.811[2]	1.450 [2] $n_{H_\alpha}^{20}$	*Investigator quotes data from Hoving, Tabl. Annuelles, II, 151, 1911.

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Hexylcyclopentene-1 		204 to 205 [72] @ 740mm	0.8079 [72]	1.4490 [72]	
1,2,3-Triethylcyclopentene-1* 		181.5 [2]	0.814 [2]	1.451 [2] $n^{20}_{H_\alpha}$	*Investigator quotes data from Hoving, Tabl. Annuelles, II, 151, 1911.
***l*-2,3,3-Trimethyl-4-isopropylcyclopentene-1** 		168 to 170 [10]	0.8095 [10] @ 19°	1.4521 [10] @ 19°	$[\alpha]_D^{14} = -6.44°$ [10]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Dodecylcyclo-pentene-1 		172 [9] @ 15mm	0.8262 [9] @ 18°	1.45667 [9]	

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(22) A. Damsky, Ber. **20,** 2959, **1887.**
(23) M. Dojarenko, J. Russ. Phys. Chem. Soc. **58,** 27, **1926.**
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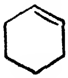
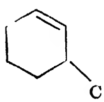
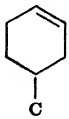
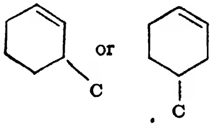
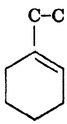
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
Cyclohexene		**83**	**0.8098_0**	**1.4465**	$\frac{dD}{dt} = -0.000940_8(1-0.000315t)$/°C. (10° to 100°)
	−80 [66]	83 [107] @ 777mm 83.5 [24] @ 765mm 82.3 [80] @ 764mm 84 [69] @ 763mm 83 to 84 [55] @ 762mm 83 to 84 [79] @ 761mm 84 to 86 [103] 83.5 [130,135] 83.3 [16] 83.1 [26] 83 to 83.5 [3] 83 to 84 [12,49,82] 82.7 [15] 82 to 84 [9,45] 81.5 to 82.5 [51] 81 to 82 [28] 80 to 81 [27] 82.8 [127] @ 759mm 81.5 to 82.5 [79] @ 756mm 83 to 84 [136] @ 753mm 83 to 84 [59] @ 752mm	0.7355 [26] @ 100° 0.7713 [107] @ 61.8° 0.7720 [107] @ 61.1° 0.7731 [107] @ 59.8° 0.7823 [26] @ 50° 0.7890 [107] @ 41.9° 0.7896 [107] @ 41.2° 0.8054 [136] @ 27° 0.8034 [51] @ 25° 0.8064 [107] @ 22.7° 0.8081 [14] @ 22.1° 0.809 [12] @ 21° 0.8021 [45] 0.805 [103] 0.8088 [107] 0.8098 [130] 0.810 [2] 0.8101 [15] 0.8102 [14] 0.8104 [36] 0.8112 [69] 0.7995 [74] D^{20}_{20} 0.809 [27] D^{20}_0	1.4428 [136] @ 27° 1.4437 [51] @ 25° 1.4445 [26] @ 25° 1.44507 [14] @ 22.1° 1.445 [12] @ 21° 1.44637 [127] @ 20.05° 1.4459 [135] 1.4460 [130] 1.44646 [107] 1.4465 [15] 1.4469 [26,69] 1.44577 [79] @ 18.7° 1.44902 [18] @ 16.4° 1.44921 [8] @ 15.1° 1.4494 [31] @ 13.5° 1.44235 [14] $n^{22.1}_{H_\alpha}$ 1.44360 [127] $n^{20.05}_{H_\alpha}$ 1.44369 [107] $n^{20}_{H_\alpha}$ 1.44302 [79] $n^{18.7}_{H_\alpha}$ 1.44516 [24] $n^{18.4}_{H_\alpha}$ 1.44610 [25] $n^{16.5}_{H_\alpha}$ 1.44623 [18] $n^{16.4}_{H_\alpha}$ 1.44653 [8] $n^{15.1}_{H_\alpha}$	$\frac{dn}{dt} = -0.000530_7$/°C$_8$ (10° to 30°) Reference [13] gives n_{Lt} and n_{Tl}.

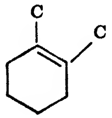
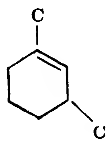
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclohexene (*Continued*)					
			0.8113 [79] @ 18.7°	1.43998 [74] $n^{14.4}_{H_\alpha}$	
			0.8120 [24] @ 18.4°	1.45184 [14] $n^{22.1}_{H_\beta}$	
			0.8111 [107] @ 17.4°	1.45312 [127] $n^{20.05}_{H_\beta}$	
			0.8138 [25,31] @ 16.5°	1.45326 [107] $n^{20}_{H_\beta}$	
			0.8143 [3,107] @ 15.6°	1.45252 [79] $n^{18.7}_{H_\beta}$	
			0.8147 [3] @ 15.1°	1.45475 [24] $n^{18.4}_{H_\beta}$	
			0.8156 [24] @ 14.9°	1.45573 [25] $n^{16.5}_{H_\beta}$	
			1.79934 [74] @ 14.4°	1.45596 [18] $n^{16.4}_{H_\beta}$	
			0.8183 [31] $D^{13.5}_{13.5}$	1.45620 [3] $n^{15.1}_{H_\beta}$	
			0.80893 [59] D^{0}_{0}	1.44943 [74] $n^{14.4}_{H_\beta}$	
				1.45743 [14] $n^{22.1}_{H_\gamma}$	
				1.45874 [127] $n^{20.05}_{H_\gamma}$	
				1.45854 [107] $n^{20}_{H_\gamma}$	
				1.45827 [79] $n^{18.7}_{H_\gamma}$	
				1.46039 [24] $n^{18.4}_{H_\gamma}$	
				1.46133 [25] $n^{16.5}_{H_\gamma}$	
				1.46194 [3] $n^{15.1}_{H_\gamma}$	
				1.45507 [74] $n^{14.4}_{H_\gamma}$	

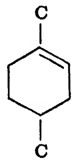
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
1-Methylcyclohexene-1		**109.5**	**0.811_7**	**1.450_6**	$\frac{dD}{dt} = -0.0009_1$/°C. (15° to 65°)
		109.1 to 109.3 [2] @ 772mm	0.7734 [107] @ 62.1°	1.44234 [111]	
		110.5 to 111.5 [29] @ 770mm	0.7743 [107] @ 61.1°	1.4496 [112]	
		109.5 to 110.5 [79] @ 770mm	0.7912 [107] @ 42.1°	1.4497 [2,6]	
		110 [107] @ 769mm	0.7918 [107] @ 41.4°	1.4498 [98]	
		108.0 to 108.5 [22] @ 769mm	0.799 [111]	1.4503 [72]	
		109 [62] @ 768mm	0.8066 [49]	1.45067 [107]	
		109.6 to 110.2 [79] @ 767mm	0.8099 [130,133]	1.4503 [2] @ 18.5°	
		103.5 [62] @ 767mm	0.810 [6]	1.44094 [46] @ 18°	
		111 to 112 [21,112]	0.8103 [2]	1.45042 [79] @ 17.9°	
		110.6 [31]	0.8106 [22,107]	1.4499 [130] @ 17.5°	
		110.5 to 111 [130,133]	0.840 [112]	1.4508 [49] @ 17.5°	
		110 to 112 [39]	0.8118 [44]	1.4543 [31,33] @ 13.5°	
		110 to 110.5 [100]	0.8122 [72]	1.458 [82] @ 12°	
		110 [6,44]	0.8127 [107]	1.44766 [107] $n^{20}_{H_\alpha}$	
		109 to 110 [98]	0.8022 [53] D^{20}_{20}	1.44744 [2] $n^{18.5}_{H_\alpha}$	
		108 [82,83,84]	0.809 [98] D^{20}_{20}	1.44763 [79] $n^{17.9}_{H_\alpha}$	
		106 to 107 [111]	0.80305 [62] D^{20}_{15}	1.45745 [107] $n^{20}_{H_\beta}$	
		103 to 105 [82,85]	0.7999 [62] D^{20}_0	1.45711 [2] $n^{18.5}_{H_\beta}$	
		107.5 to 108.5 [46] @ 759.5mm	0.8005 [62] D^{20}_0	1.45735 [79] $n^{17.9}_{H_\beta}$	
		108.9 to 109.2 [2] @ 754mm	0.8115 [2] @ 18.5°	1.46259 [107] $n^{20}_{H_\gamma}$	
			0.8115 [79] @ 18.2°	1.46293 [2] $n^{18.5}_{H_\gamma}$	
			0.8075 [46] D^{18}_{18}	1.46328 [79] $n^{17.9}_{H_\gamma}$	

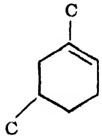
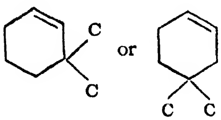
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
1-Methylcyclohexene-1 (*Continued*)					
		109 to 110 [72] @ 753mm	0.8117 [79] @ 17.9°		
		106 to 107 [44] @ 751.5mm	0.8145 [2] @ 14.8°		
		108 [63] @ 747mm	0.8182 [107] @ 14.2°		
			0.8257 [31,33] $D_{13.5}^{13.5}$		
			0.8166 [62] @ 0°		
			0.8172 [62] D_0^0		
			0.821 [85] D_0^0		
			0.823 [82] D_0^0		
			0.827 [83,84] D_0^0		
3-Methylcyclohexene-1		**104.4**			
		105 to 106 [50]	0.7950 [36] @ 26°	1.4408 [36] @ 26°	
		105 [62]	0.80177 [53] $D_{21.8}^{21.8}$	1.44236 [53]	
		104 to 106 [95]		1.4445 [6,109]	
		104 to 105 [36]	0.8048 [50] @ 20.3°	1.4454 [50]	
		104 [60,130]		1.4451 [130] @ 17°	
		103 to 105 [6,82,109]	0.805 [6]		
			0.806 [109]	1.4459 [35] @ 14°	
		103.25 to 103.5 [53] @ 752mm	0.8009 [130]		
		104 [35] @ 743mm	0.803 [35] @ 14°		

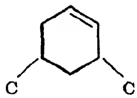
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
4-Methylcyclohexene-1 		102.5 to 102.7 [70] @ 772mm 103 to 106 [47] @ 765mm 104 to 105 [12] @ 762mm 102 to 103 [37] 102.5 to 103.5 [95] 102.5 to 103 [130] 102.8 to 103 [100] 103 [61] 105 [57,82] 102 to 102.5 [55] @ 755mm 101 to 102 [61] @ 754mm 101.9 [60,61] @ 753mm 102.5 [24] @ 750mm 102.5 [85] @ 743mm	0.8000 [130] 0.8001 [70] 0.8003 [60,61] D^{20}_{20} 0.7986 [60,61] D^{20}_0 0.8023 [24] @ 17.6° 0.804 [12] @ 17° 0.8047 [60,61] D^{15}_{15} 0.805 [35] @ 14° 0.8086 [31,33] $D^{13.5}_{13.5}$ 0.819 [82] D^0_0 0.8207 [60,61] D^0_0	1.4419 [70] 1.4423 [130] @ 18° 1.442 [12] @ 17° 1.4445 [35] @ 14° 1.4449 [31,32] @ 13.5° 1.44138 [24] $n^{17.6}_{H_\alpha}$ 1.45069 [24] $n^{17.6}_{H_\beta}$ 1.45620 [24] $n^{17.6}_{H_\gamma}$	
***d*-4-Methyl-cyclohexene-1**		102 [128] @ 757mm 101.9 [61] @ 753mm	0.8002 [128] @ 16°	1.4443 [128] @ 16°	$[\alpha]^{20}_D = +110°$ [58] $[\alpha]^{20}_D = +107.05$ [120]

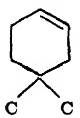
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3- or 4-Methyl-cyclohexene-1 		106 to 107 [115] 103 to 103.5 [129] @ 750mm 105 to 106 [136] @ 745mm	0.7937 [129] @ 27° 0.799 [115] 0.8019 [136]	1.4387 [129] @ 27° 1.44234 [115] 1.4444 [136]	$[\alpha]_D = +17.78°$ [136] $[\alpha]_D = +81.47°$ [129]
C_8H_{14} **1-Ethylcyclohexene-1** 		135 to 136 [2] @ 768mm 135.8 to 136.8 [79] @ 768mm 135.7 to 136.6 [98] 134 to 136 [124] 134 to 134.5 [22] 134 to 135 [124] 134 [83,84] 134 to 135 [49] @ 751.5mm 49 [11] @ 30mm	0.8171 [49] 0.8217 [22] 0.8260 [63,124] 0.828 [98] D_{20}^{20} 0.8238 [2] @ 19 1° 0.8235 [124] @ 19° 0.8268 [79] @ 15.5° 0.8270 [79] @ 15.25°	1.4547 [49] @ 22.3° 1.4583 [98] 1.4576 [63,124] 1.4567 [32] @ 19.05° 1.4591 [124] @ 19° 1.45966 [79] @ 15.25° 1.45386 [2] $n_{H_\alpha}^{19.05}$ 1.45694 [79] $n_{H_\alpha}^{15.25}$ 1.46347 [2] $n_{H_\beta}^{19.05}$ 1.46673 [79] $n_{H_\beta}^{15.25}$ 1.46944 [2] $n_{H_\gamma}^{19.05}$ 1.47269 [79] $n_{H_\gamma}^{15.25}$	

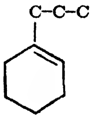
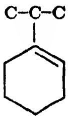
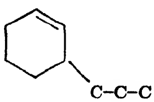
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Dimethyl-cyclohexene-1		136	0.823_2		$\frac{dD}{dt} = -0.0008_2$/°C. (15° to 30°)
		136 to 137.5 [64] 135.5 to 137.7 [17] 135.5 to 136.5 [131] 135.4 to 135.9 [98] 135 to 137 [65,114] 132 [82,86]	0.81495 [17] @ 30° 0.8226 [131] 0.82317 [17] 0.8234 [65] 0.824 [64,114] 0.826 [98] D_{20}^{20} 0.8269 [131] @ 15° 0.82726 [17] @ 15° 0 830 [82] @ 14° 0.8315 [3] @ 13.7° 0.8317 [3] @ 13.5° 0.8411 [82,86] D_0^0	1.4580 [131] @ 21.5° 1.460 [64] 1.4590 [98] 1.4587 [114] 1.45664 [65] 1.462 [82] @ 14° 1.46178 [3] @ 13.5° 1.45643 [17] $n_{H_\alpha}^{20}$ 1.45906 [3] $n_{H_\alpha}^{13.5}$ 1.46663 [17] $n_{H_\beta}^{20}$ 1.46908 [3] $n_{H_\beta}^{13.5}$ 1.47244 [17] $n_{H_\gamma}^{20}$ 1.47517 [3] $n_{H_\gamma}^{13.5}$	
1,3-Dimethylcyclo-hexene-1			0.802_6		$\frac{dD}{dt} = -0.00082$/°C. (15° to 30°)
		128.0 to 128.4 [17] 124 to 126 [80]	0.79448 [17] @ 30° 0.8006 [80] 0.8026 [17] 0.80677 [17] @ 15°	1.4487 [80] 1.44501 [17] $n_{H_\alpha}^{20}$ 1.45462 [17] $n_{H_\beta}^{20}$ 1.46013 [17] $n_{H_\gamma}^{20}$	

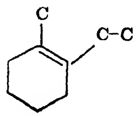
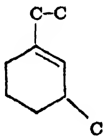
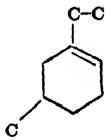
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,4-Dimethylcyclohexene-1		**127.5**	**0.801_5**	**1.445_9**	$\frac{dD}{dt} = -0.0009_7$/°C. (0° to 30°)
	−59.4 [17]	127 to 129 [49] @ 764mm 128.7 [17] 128.5 [131,135] 127 to 128 [114] 125.6 to 126 [33] 125 [82,86,87] 127.5 to 128 [71] @ 756mm 124 to 126 [3] @ 751mm	0.79240 [17] @ 30° 0.7985 [3] @ 22.4° 0.7989 [3] @ 22° 0.8005 [131, 132, 135] 0.80061 [17] 0.8024 [71] 0.8030 [49] 0.8020 [114] @ 19.5° 0.80472 [17] @ 15° 0.8111 [82,87] @ 14° 0.8175 [31,33] $D^{13.5}_{13.5}$ 0.8207 [82,87] @ 0° 0.8208 [86] D^0_0	1.44372 [3] @ 22° 1.4457 [131, 132, 135] 1.4459 [114] 1.4461 [71] 1.4502 [49] @ 19° 1.451 [82,87] @ 14° 1.4486 [31] @ 13.5° 1.44112 [3] $n^{22.0}_{H_\alpha}$ 1.44300 [17] $n^{20}_{H_\alpha}$ 1.45056 [3] $n^{22.0}_{H_\beta}$ 1.45242 [17] $n^{20}_{H_\beta}$ 1.45626 [3] $n^{22.0}_{H_\gamma}$ 1.45805 [17] $n^{20}_{H_\gamma}$	

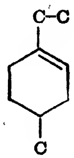
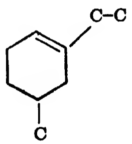
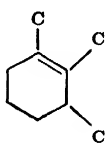
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5-Dimethylcyclohexene-1		127			
		127.5 to 128.5 [114] 127.4 to 127.8 [98] 124 to 126 [3] 124 to 125 [50] 124 [82,86] 127 to 129 [49] @ 758mm 126 to 127 [136] @ 750mm	0.7998 [3] @ 22.6° 0.8000 [3] @ 22.4° 0.8015 [136] @ 22° 0.8025 [114] @ 21° 0.8056 [49] 0.807 [7] 0.805 [98] D_{20}^{20} 0.8005 [50] @ 18° 0.8122 [82] @ 12° 0.8210 [82,86] D_0^0	1.44533 [3] @ 22.4° 1.4466 [136] @ 22° 1.4466 [114] @ 21° 1.4430 [50] 1.4480 [61,98] 1.451 [7] 1.4547 [49] @ 19.5° 1.451 [82] @ 12° 1.44263 [3] $n_{H_\alpha}^{22.4}$ 1.45215 [3] $n_{H_\beta}^{22.4}$ 1.45795 [3] $n_{H_\gamma}^{22.4}$	
3,3-Dimethylcyclohexene-1					
		118.5 to 120 [134] @ 752mm	0.7970 [134] @ 21°	1.4439 [134] @ 21°	

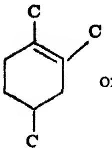
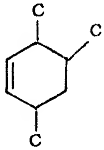
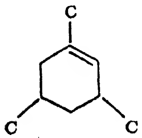
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,5-Dimethylcyclohexene-1 		125 to 126 [7] @ 764mm	0.797 [3] @ 21.1°	1.44361 [3] @ 21.1°	
		124 to 126 [90]	0.8065 [7] @ 20.6°	1.45083 [7] @ 20.6°	
		124 to 125 [60]	0.8062 [7] @ 19.4°	1.44933 [7] @ 20.2°	
		126 to 127 [3] @ 746mm	0.8074 [7] @ 18.4°	1.443 [60] @ 18°	
			0.8101 [7] @ 18.1°	1.45372 [7] @ 18°	
			0.8005 [60] @ 18°	1.45082 [7] @ 17°	
			0.8009 [3] @ 15.6°	1.44603 [3] @ 15.6°	
				1.44086 [3] $n_{H_\alpha}^{21.1}$	
				1.44784 [7] $n_{H_\alpha}^{20.6}$	
				1.44634 [7] $n_{H_\alpha}^{20.2}$	
				1.44793 [7] $n_{H_\alpha}^{18.0}$	
				1.45014 [17] $n_{H_\alpha}^{17}$	
				1.44315 [3] $n_{H_\alpha}^{15.6}$	
				1.45020 [3] $n_{H_\beta}^{21.1}$	
				1.45801 [7] $n_{H_\beta}^{20.6}$	
				1.45642 [7] $n_{H_\beta}^{20.2}$	
				1.46078 [7] $n_{H_\beta}^{18.0}$	
				1.45800 [7] $n_{H_\beta}^{17}$	
				1.45263 [3] $n_{H_\beta}^{15.6}$	

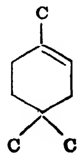
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3,5-Dimethylcyclo-hexene-1 (*Continued*)				1.45587 [3] $n^{21.1}_{H_\gamma}$ 1.46413 [7] $n^{20.6}_{H_\gamma}$ 1.46255 [7] $n^{20.2}_{H_\gamma}$ 1.46728 [7] $n^{18.0}_{H_\gamma}$ 1.46390 [7] $n^{17}_{H_\gamma}$ 1.45835 [3] $n^{15.6}_{H_\gamma}$	
4,4-Dimethyl-cyclohexene-1 		117 to 117.5 [20] @ 770mm 119.5 to 121.2 [5] @ 767mm 120 to 122 [43] 120 to 122 [5] @ 750mm	0.7970 [20] D^{25}_{25} 0.803 [5] 0.8092 [43] @ 16.6° 0.8056 [5] @ 16.2° 0.80267 [20] @ 15.8° 0.8040 [20] D^{15}_{15} 0.8089 [5] @ 13.5° 0.8129 [20] @ 4°	1.4435 [5] 1.4479 [43] @ 16.6° 1.44521 [5] @ 16.2° 1.44251 [5] $n^{16.2}_{H_\alpha}$ 1.44218 [20] $n^{15.8}_{H_\alpha}$ 1.44604 [5] $n^{13.5}_{H_\alpha}$ 1.45182 [5] $n^{16.2}_{H_\beta}$ 1.45137 [20] $n^{15.8}_{H_\beta}$ 1.45531 [5] $n^{13.5}_{H_\beta}$ 1.45722 [5] $n^{16.2}_{H_\gamma}$ 1.45700 [20] $n^{15.8}_{H_\gamma}$ 1.46100 [5] $n^{13.5}_{H_\gamma}$	

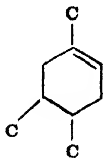
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Propylcyclohexene-1 		154.7 to 157.7 [98] 154.5 to 155.5 [97,120] 154 [83,84]	0.826 [98] D_{20}^{20} 0.838 [120] @ 19° 0.8181 [97] @ 19°	1.4578 [98] 1.4541 [97] @ 19° 1.4579 [120] @ 19°	
1-Isopropylcyclo-hexene-1 		156.5 [2] @ 772mm 156 [2,6] 155 to 157 [123] 151.7 to 154.5 [98] 161 to 162 [22] @ 755mm 87 to 88 [22] @ 20mm	0.826 [2,3,6] 0.829 [123] 0.830 [98] D_{20}^{20} 0.8302 [2] @ 15.2° 0.8320 [2] @ 12.9°	1.4594 [98] 1.4593 [2,6] 1.4606 [123] 1.46150 [2] @ 15.2° 1.45884 [2] $n_{H_\alpha}^{15.2}$ 1.46851 [2] $n_{H_\beta}^{15.2}$ 1.47436 [2] $n_{H_\gamma}^{15.2}$	
3-Propylcyclohexene-1 		155 to 156 [96]	0.8240 [96] @ 19°	1.4564 [96] @ 19°	

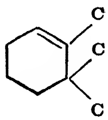
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-2-ethyl-cyclohexene-1 		156.7 to 157.0 [98]	0.832 [98] D_{20}^{20}	1.4630 [98]	
3-Methyl-1-ethyl-cyclohexene-1 or 5-Methyl-1-ethyl-cyclohexene-1  or 		149 to 151 [56] 148 to 149 [6]	0.813 [6] 0.8296 [56] 0.8366 [56] @ 0°	1.4537 [6] 1.454 [56]	
***d*-3-Methyl-1-ethyl-cyclohexene-1 or *d*-5-Methyl-1-ethyl-cyclohexene-1**		148 to 149 [136] @ 743mm	0.8087 [136] @ 25°	1.4514 [136] @ 25°	$[\alpha]_D = +56.8°$ [136]

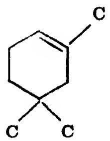
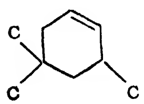
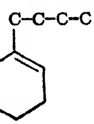
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Methyl-1-ethyl-cyclohexene-1			**0.814_5**	**1.452_6**	$\frac{dD}{dt} = -0.00066$/°C. (0° to 20°)
		153 to 154 [116] 151.5 to 151.7 [98] 151 to 152 [71] 149 [6,82,87]	0.8145 [116] @ 22° 0.8133 [71] 0.814 [6] 0.814 [98] D_{20}^{20} 0.8169 [82,87] @ 16° 0.8278 [82,87] @ 0°	1.4514 [116] @ 22° 1.4510 [6] 1.4522 [71] 1.4528 [98] 1.453 [82,87] @ 16°	
4-Methyl-2-ethyl-cyclohexene-1					
		151.9 to 152.1 [98]	0.815 [98] D_{20}^{20}	1.4544 [98]	
1,2,3-Trimethyl-cyclohexene-1					
		149.6 to 150 [4] @ 749mm	0.828 [4] 0.8347 [4] @ 11.75°	1.4593 [4] 1.46296 [4] @ 11.75° 1.46015 [4] $n_{H_\alpha}^{11.75}$ 1.47021 [4] $n_{H_\beta}^{11.75}$ 1.47603 [4] $n_{H_\gamma}^{11.75}$	

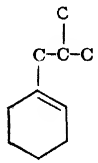
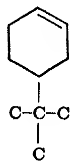
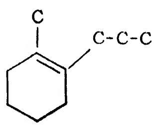
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4-Trimethyl-cyclohexene-1 or -5					
 or 			0.8184 [31,33] $D_{13.5}^{13.5}$	1.4561 [31,33] @ 13.5°	
1,3,5-Trimethyl-cyclohexene-1					
		139 to 141 [3] @ 766mm	0.7941 [3] @ 24.7°	1.44378 [3] @ 24.7°	
		142.5 to 143.5 [125]	0.7965 [125] @ 21°	1.447 [125] @ 21°	
		140.5 to 142 [3]	0.8025 [3] @ 14.3°	1.44909 [3] @ 13.5°	
		140 [3]	0.8048 [3] @ 13.8°	1.44917 [3] @ 13.1°	
			0.8031 [3] @ 13.5°	1.44102 [3] $n_{H_\alpha}^{24.7}$	
				1.44604 [3] $n_{H_\alpha}^{13.5}$	
				1.44625 [3] $n_{H_\alpha}^{13.1}$	
				1.45057 [3] $n_{H_\beta}^{24.7}$	
				1.45591 [3] $n_{H_\beta}^{13.5}$	
				1.45596 [3] $n_{H_\beta}^{13.1}$	
				1.45638 [3] $n_{H_\gamma}^{24.7}$	
				1.46155 [3] $n_{H_\gamma}^{13.5}$	
				1.46154 [3] $n_{H_\gamma}^{13.1}$	

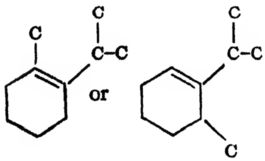
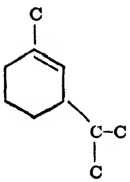
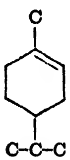
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,4,4-Trimethyl-cyclohexene-1 		139.5 to 140.5 [5] 44.4 [5] @ 21mm 36.3 to 37.3 [5] @ 14mm	0.8021 [5] @ 23.15° 0.804 [5] 0.8032 [5] @ 18.8° 0.8096 [5] @ 15.1° 0.8098 [5] @ 14.8°	1.44422 [5] @ 23.15° 1.4456 [5] 1.44592 [5] @ 18.9° 1.44921 [5] @ 15.1° 1.44152 [5] $n_{H_\alpha}^{23.15}$ 1.44322 [5] $n_{H_\alpha}^{18.9}$ 1.44643 [5] $n_{H_\alpha}^{15.1}$ 1.45086 [5] $n_{H_\beta}^{23.15}$ 1.45263 [5] $n_{H_\beta}^{18.9}$ 1.45591 [5] $n_{H_\beta}^{15.1}$ 1.45652 [5] $n_{H_\gamma}^{23.15}$ 1.45822 [5] $n_{H_\gamma}^{18.9}$ 1.46164 [5] $n_{H_\gamma}^{15.1}$	

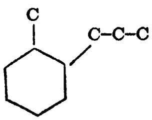
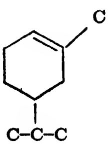
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
cis-1,4,5-Trimethyl-cyclohexene-1 		147 [99]	0.814 [99]	1.44905 [99]	
trans-1,4,5-Trimethyl-cyclohexene-1		145 [99]	0.805 [99]	1.44820 [99]	
1,4,5-Trimethyl-cyclohexene-1 (Mixtures of *cis* and *trans* isomers)		144 to 146 [1]	0.805 [1] 0.8078 [1] @ 16.25°	1.4482 [1] 1.44990 [1] @ 16.25° 1.44742 [1] $n_{H_\alpha}^{16.25}$ 1.45683 [1] $n_{H_\beta}^{16.25}$ 1.46264 [1] $n_{H_\gamma}^{16.25}$	

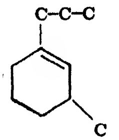
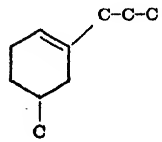
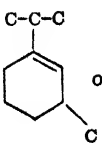
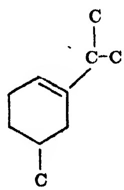
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,3,3-Trimethyl-cyclohexene-1 		146.2 to 147.2 [5] @ 767mm 144 to 146 [32]	0.8217 [5] @ 20.3° 0.8278 [5] @ 15.0° 0.8300 [5] @ 15.0° 0.862 [32] @ 14°	1.45603 [5] @ 20.4° 1.45859 [5] @ 14.8° 1.45889 [5] @ 15.0° 1.4590 [32] @ 14° 1.45336 [5] $n_{H_\alpha}^{20.4}$ 1.45638 [5] $n_{H_\alpha}^{15.0}$ 1.45602 [5] $n_{H_\alpha}^{14.8}$ 1.46298 [5] $n_{H_\beta}^{20.4}$ 1.46597 [5] $n_{H_\beta}^{15.0}$ 1.46567 [5] $n_{H_\beta}^{14.8}$ 1.46877 [5] $n_{H_\gamma}^{20.4}$ 1.47173 [5] $n_{H_\gamma}^{15.0}$ 1.47183 [5] $n_{H_\gamma}^{14.5}$	

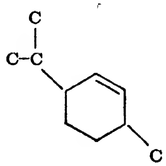
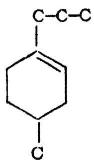
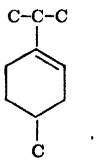
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,4,4-Trimethyl-cyclohexene-1 		138 to 139 [6] 137 to 140 [19] 139 to 141 [50] @ 759mm 138 to 142 [38] @ 735mm	0.7981 [50] @ 23° 0.7911 [38] @ 21.5° 0.8094 [6] @ 17.8° 0.8085 [19] D_{15}^{15} 0.8117 [6] @ 14.4°	1.4453 [50] @ 23° 1.44612 [38] @ 21.5° 1.44671 [6] @ 17.8° 1.4473 [6] @ 14.4° 1.44402 [6] $n_{H_\alpha}^{17.8}$ 1.45332 [6] $n_{H_\beta}^{17.8}$ 1.45900 [6] $n_{H_\gamma}^{17.8}$	
3,5,5-Trimethyl-cyclohexene-1 		138 to 140 [101]	0.7978 [101]	1.4434 [101]	
$C_{10}H_{18}$ **1-Butylcyclohexene-1** 		180.8 to 182.9 [98]	0.828 [98] D_{20}^{20}	1.4591 [98]	

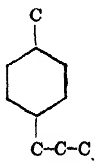
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
l-1-sec-Butylcyclo-hexene-1 		172 to 174 [54] 172 to 174.5 [22] @ 755mm	0.8410 [22] 0.829 [54] D_{20}^{20}	1.4590 [54]	$[\alpha]_D^{20} = -4.06°$ [54]
4-tert-Butyl-cyclohexene-1 		172 [76] @ 745mm	0.8173 [76] @ 40° 0.8315 [76]	1.4587 [76]	$\frac{dD}{dt} = -0.0007_1$/°C. (20° to 40°)
1-Methyl-2-propyl-cyclohexene-1 		177.3 to 177.8 [98]	0.832 [98] D_{20}^{20}	1.4627 [98]	

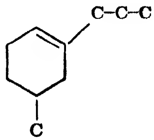
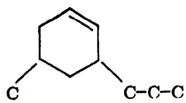
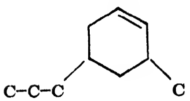
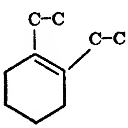
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1- or 3-Methyl-2-isopropylcyclohexene-1 		165 to 168 [48,108]			
1-Methyl-3-isopropyl-cyclohexene-1 		164 to 168 [119]		1.4561 [119]	
1-Methyl-4-isopropyl-cyclohexene-1 		174 to 175 [113]	0.821 [113] @ 21°	1.4551 [113] @ 21°	

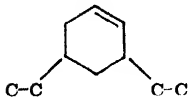
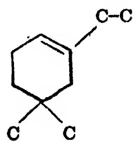
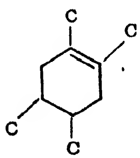
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
d-1-Methyl-4-iso-propylcyclohexene-1		175 to 177 [106] 174 to 176 [8] 173 to 174 [92] 171 to 172 [92]	0.8258 [8] 0.829 [92] 0.8246 [106] @ 18°	1.4580 [8] 1.4601 [92] 1.4563 [106] @ 18°	
l-1-Methyl-4-iso-propylcyclohexene-1		172 to 174.5 [52]	0.8230 [52] @ 16.5°	1.45979 [52]	$[\alpha]_D = -2.07°$ [52]
1-Methyl-2-propyl-cyclohexene-x 		167 to 170 [68]	0.848 [68] 0.8611 [68] @ 0°	1.469 [68]	
2-Methyl-4-isopropyl-cyclohexene-1 		169 to 172 [91] 167 to 168 [42]	0.828 [91] 0.8222 [42] D_{20}^{20}	1.462 [91] @ 0° 1.45683 [42]	

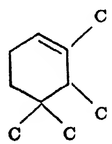
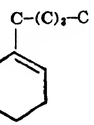
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Methyl-1-propyl-cyclohexene-1 or 4-Methyl-2-propyl-cyclohexene-1					
 or 		168 to 171 [56]	0.8302 [56] @ 15° 0.8375 [56] @ 0°	1.456 [56]	
3-Methyl-1-isopropyl-cyclohexene-1 or 4-Methyl-2-isopropyl-cyclohexene-1					$[\alpha]_D = +23.34°$ [34]
d-form		168 to 169 [75] @ 764mm 165 [34]	0.8125 [34] @ 25°	1.4519 [34] @ 25°	
 or 					
dl-form		165 [34]	0.8154 [34] @ 25°	1.4534 [34] @ 25°	

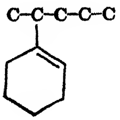
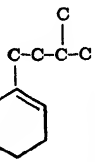
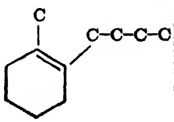
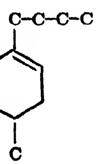
Name and Carbon Skeleton	M. P.,°C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Methyl-6-isopropyl-cyclohexene-1 		167.1 [13] @ 768.6mm 55 to 56 [93] @ 12mm	0.824 [93]	1.461 [93]	
4-Methyl-1-propyl-cyclohexene-1 		173.2 to 174.2 [98] 173 to 176 [117,118]	0.815 [98] D_{20}^{20}	1.4533 [98]	
4-Methyl-1-isopropyl-cyclohexene-1 		175 [10] 170 [88] 166 to 167 [82]	0.823 [82] D_0^0 0.827 [88] D_0^0		

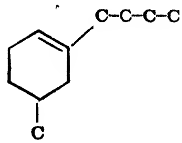
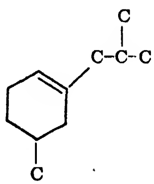
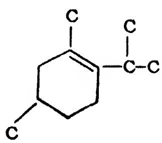
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***d*-4-Methyl-1-isopropylcyclohexene-1**		168 to 168.5 [128] @ 758mm 165.5 [105] @ 739mm	0.7632 [24] @ 79.8° 0.8118 [104] 0.8132 [105] 0.8132 [24] @ 16.8° 0.8141 [128] @ 16°	1.4532 [128] @ 16° 1.42042 [24] $n_{H_\alpha}^{79.8}$ 1.44970 [24] $n_{H_\alpha}^{16.8}$ 1.42920 [24] $n_{H_\beta}^{79.8}$ 1.45906 [24] $n_{H_\beta}^{16.8}$ 1.43432 [24] $n_{H_\gamma}^{79.8}$ 1.46460 [24] $n_{H_\gamma}^{16.8}$	$[\alpha]_D^{20} = +115.64°$ [104] $[\alpha]_D = +112.75°$ [128] $[\alpha]_D^{26.6} = +32.77°$ [105]
1-Methyl-4-propylcyclohexene-*x* 		168 to 170 [82,87]	0.8270 [82,87] @ 16° 0.8387 [82,87] @ 0°	1.455 [82,87] @ 16°	

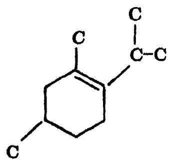
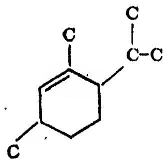
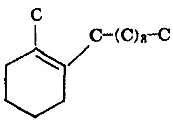
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_{4}	n^{20}_{D}	*Additional Data*
4-Methyl-2-propyl-cyclohexene-1 		172.6 to 173.2 [98]	0.816 [98] D^{20}_{20}	1.4546 [98]	
5-Methyl-3-propyl-cyclohexene-1 or 3-Methyl-5-propyl-cyclohexene-1  or 		169 to 170 [50]	0.8197 [50] @ 16°	1.45609 [50] @ 16°	
1,2-Diethylcyclo-hexene-1 		54 to 55 [81] @ 10mm			

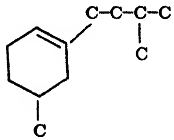
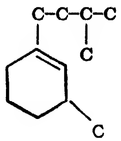
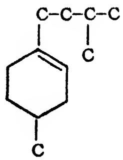
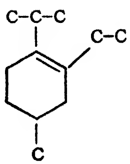
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3,5-Diethylcyclo-hexene-1 		163 to 166 [41]	0.83141 [41] D_{20}^{20}	1.46519 [41]	
4,4-Dimethyl-2-ethyl-cyclohexene-1 		69 @ 32mm [6]	0.832 [6]	1.4616 [6]	
1^c,2^c,4,5-Tetramethyl-cyclohexene-1 		169 [99]	0.828 [99]	1.46053 [99]	
1^c,2^t,4,5-Tetramethyl-cyclohexene-1		166 [99]	0.817 [99]	1.45722 [99]	

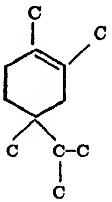
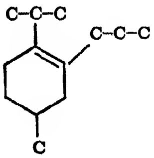
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2,4,5-Tetramethyl-cyclohexene-1		165 to 167 [1]	0.817 [1] 0.8199 [1] @ 16.5°	1.4572 [1] 1.45880 [1] @ 16.5° 1.45617 [1] $n_{H_\alpha}^{16.5}$ 1.46597 [1] $n_{H_\beta}^{16.5}$ 1.47192 [1] $n_{H_\gamma}^{16.5}$	
2,3,4,4-Tetramethyl-cyclohexene-1 		169 to 172 [91,94] 167 to 169 [89] 62.5 to 65 [58] @ 17mm	0.828 [91,94] 0.8208 [58] D_{20}^{20} 0.8328 [89] D_{15}^{15}	1.462 [91,94] 1.4621 [58] 1.4629 [89] @ 15°	
$C_{11}H_{20}$ **1-Pentylcyclohexene-1** 		203.4 to 205 [98]	0.831 [98] D_{20}^{20}	1.4605 [98]	

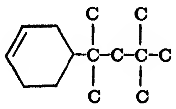
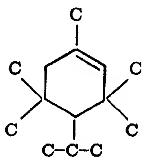
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Cyclohexen-1-yl-pentane 		194 [83,84]	0.856 [84] D_0^0		
3-Methyl-1-cyclo-hexen-1-yl-butane 		194.5 to 196.5 [98]	0.826 [98] D_{20}^{20}	1.4596 [98]	
1-Methyl-2-butylcyclo-hexene-1 		197.8 to 199.1 [98]	0.833 [98] D_{20}^{20}	1.4637 [98]	
4-Methyl-1-butylcyclo-hexene-1 		196.3 to 197.1 [98]	0.818 [98] D_{20}^{20}	1.4558 [98]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-Methyl-2-butyl-cyclohexene-1 		195.2 to 195.7 [98]	0.820 [98] D_{20}^{20}	1.4574 [98]	
4-Methyl-2-(2-methyl-propyl)-cyclohexene-1 		184.1 to 186.2 [98]	0.812 [98] D_{20}^{20}	1.4530 [98]	
1,5-Dimethyl-2-iso-propylcyclohexene-1 		180 to 183 [77] @ 763mm; 184 to 186 [77] @ 767mm; 68 to 74 [77] @ 10mm	0.8550 [77] @ 25°	1.4585 [77] @ 25°; 1.4600 [77] @ 25°; 1.4578 [77] @ 17°	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,5-Dimethyl-2-isopropylcyclohexene-1 or -6  or 		185 to 187 [126] @ 764mm 186 to 187 [110]	0.8215 [110] @ 23° 0.8432 [126] D_0^0	1.4579 [110] @ 23°	
$C_{12}H_{22}$ **1-Methyl-2-pentylcyclohexene-1** 		218.9 to 219.7 [98]	0.834 [98] D_{20}^{20}	1.4646 [98]	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
4-Methyl-2-(3-methylbutyl)-cyclohexene-1 or 3-Methyl-1-(3-methylbutyl)-cyclohexene-1  or 		209 to 211 [56]	0.8190 [56] 0.8301 [56] @ 0°	1.459 [56]	
4-Methyl-1-(3-methylbutyl)-cyclohexene-1 		210 [82,87]	0.8213 [82,87] @ 16° 0.8333 [82,87] @ 0°	1.458 [82,87] @ 16°	
4-Methyl-2-ethyl-1-isopropylcyclohexene-1 		90 to 92 [77] @ 21mm 73 to 75 [77] @ 10mm	0.8302 [77] @ 25°	1.4614 [77] @ 25° 1.4610 [77] @25°	$[\alpha]_D^{16} = +39.18°$ [77]

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2,4-Trimethyl-4-isopropylcyclohexene-1					
		93 to 95 [78] @ 20mm	0.84231 [78] @ 25° 0.860 [78] @ 0°	1.46635 [78] @ 25° 1.46363 [78] $n_{H_\alpha}^{25}$ 1.47299 [78] $n_{H_\beta}^{25}$ 1.47856 [78] $n_{H_\gamma}^{25}$	
$C_{13}H_{24}$					
4-Methyl-2-propyl-1-isopropylcyclohexene-1					$[\alpha]_D^{18} = +35.90°$ [77]
		100 to 103 [77] @ 18mm	0.8348 [77] @ 25°	1.4605 [77] @ 25°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4-(1,1,3,3-Tetramethyl-butyl)-cyclohexene-1 		113 [73] @ 12mm	0.8565 [73] @ 25°	1.4741 [73] @ 25°	
1,3,3,5,5-Pentamethyl-4-isopropylcyclo-hexene-1 		122 to 123 [67] @ 29mm	0.8696 [67] @ 17° 0.8799 [67] @ 0°	1.48767 [67] @ 17°	

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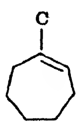
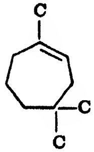
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cycloheptene		**115**	**0.8253**	**1.457_4**	$\frac{dD}{dt} = -0.00088_4$/°C. (0° to 65°) $\frac{dn}{dt} = -0.0005_1$/°C. (13° to 20°)
(Suberene) 		114.5 to 115 [10] @ 774mm 115 [12] 114.5 to 115 [5,6] 114 to 115 [12] 113 to 115 [7] 113 to 115 [8] @ 752mm 112 to 114 [9] @ 720mm	0.7884 [10] @ 62.1° 0.7885 [10] @ 62.0° 0.8052 [10] @ 42.1° 0.8059 [10] @ 41.4° 0.8228 [7] 0.823 [4] 0.8239 [8] 0.8254 [9] 0.8255 [10] 0.8245 [5,6] D_{20}^{20} 0.814 [9] @ 19° 0.8272 [10] @ 17.9° 0.8359 [1,3] $D_{13.5}^{13.5}$ 0.8407 [5,6] D_0^0	1.45301 [4] 1.4545 [8] 1.4552 [7] 1.45737 [10] 1.4585 [9] 1.4512 [9] @ 19° 1.4607 [1,3] @ 13.5° 1.45450 [10] $n_{H_\alpha}^{20.0}$ 1.46438 [10] $n_{H_\beta}^{20.0}$ 1.46966 [10] $n_{H_\gamma}^{20.0}$	
C_8H_{14} **1-Methylcyclo-heptene-1**		**138**	**0.826_2**	**1.458_0**	$\frac{dD}{dt} = -0.0010_6$/°C. (10° to 25°)
		137.5 to 138.5 [11] 137 to 138 [2] 133 to 135 [9] @ 720mm 74 to 75 [9] @ 100mm	0.8243 [9] @ 22° 0.824 [11] @ 19.5° 0.8294 [2] @ 15° 0.8350 [1,3] $D_{13.5}^{13.5}$	1.4575 [9] @ 22° 1.4581 [11] @ 19.5° 1.4581 [2] @ 15° 1.4604 [1,3] @ 13.5°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4,4-Trimethyl-cycloheptene-1 (Eucarvene) 		161 to 165 [9] @ 720mm	0.8185 [9]	1.4561 [9]	

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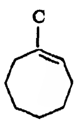
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
Cycloöctene 		145 to 146 [3] 143 to 144 [1] 145 [9] @ 730mm 140 to 142 [5] @ 720mm	0.8415 [3] 0.855 [9] 0.8486 [5] @ 19° 0.8487 [1] @ 17° 0.8497 [2] $D^{13.5}_{13.5}$ 0.871 [9] @ 0°	1.468$_5$ 1.4678 [3] 1.4736 [9] 1.4739 [9] 1.4683 [1] @ 17° 1.4700 [2] @ 13.5° 1.4787 [5] $n^{18.5}_{He_b}$ 1.4767 [5] $n^{18.5}_{He_{bg}}$ 1.4759 [5] $n^{18.5}_{He_g}$ 1.4670 [5] $n^{18.5}_{He_r}$ 1.4814 [5] $n^{18.5}_{He_v}$ 1.4703 [5] $n^{18.5}_{He_y}$	
C_9H_{16} 1-Methylcycloöctene-1 		158 to 160 [1] 165 to 169 [6] @ 730mm	0.8487 [6] 0.8515 [1] @ 15° 0.8525 [2] $D^{13.5}_{13.5}$	1.4691 [6] 1.4673 [1] @ 15° 1.4720 [2] @ 13.5°	

Name and Carbon Skeleton	M. P.,°C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cyclopentadecene					
	36 to 37 [5]	122 to 123 [5] @ 1.2mm	0.8416 [5] @ 68.5° 0.8429 [5] @ 66.5°	1.4728 [5] $n^{69}_{He_b}$ 1.4791 [5] $n^{52.4}_{He_b}$ 1.4710 [5] $n^{69}_{He_{bg}}$ 1.4703 [5] $n^{69}_{He_g}$ 1.4765 [5] $n^{52.4}_{He_g}$ 1.4620 [5] $n^{69}_{He_r}$ 1.4682 [5] $n^{52.4}_{He_r}$ 1.4753 [5] $n^{69}_{He_v}$ 1.4816 [5] $n^{52.4}_{He_v}$ 1.4651 [5] $n^{69}_{He_y}$ 1.4713 [5] $n^{52.4}_{He_y}$	
$C_{16}H_{30}$ **1-Methylcyclopentadecene-1**					
		152 to 153 [7] @ 12mm	0.8697 [7] @ 22°	1.4853 [7] @ 22°	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methylcyclopentadecene-2 or -3					$[\alpha]_D = -8.8°$ [4]
(Muscene)		120 @ 1mm [4]			
$C_{17}H_{32}$					
Cycloheptadecene					
(Civetene)	47 [8]	115 [8] @ 0.3mm			

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(2) M. Godchot and G. Cauquil, Compt. rend. **191**, 1326, 1930.
(3) N. A. Rosanoff, J. Russ. Phys. Chem. Soc. **61**, 2313, 1929.
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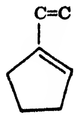
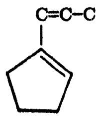
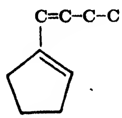
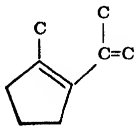
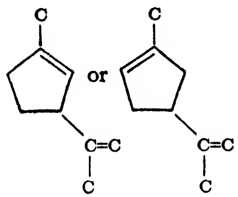
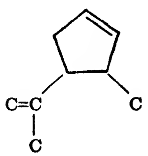
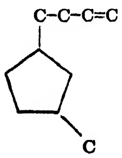
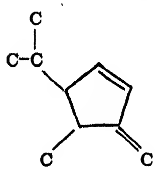
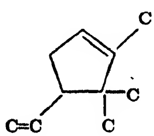
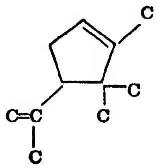
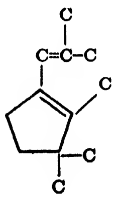
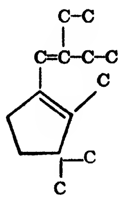
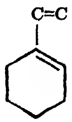
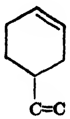
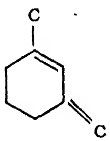
2. CYCLENES WITH AN ALKENYL OR OLEFIN SUBSTITUTION, C_nH_{2n-4}

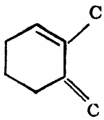
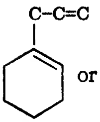
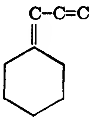
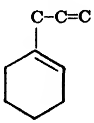
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Ethenylcyclo-pentene-1 		114 to 115 [90] @ 754mm	0.824 [90] @ 18°	1.4870 [90] @ 18°	
C_8H_{12} **1-Propen-1-ylcyclo-pentene-1** 		142 to 144 [90] @ 754mm	0.835 [90] @ 21°	1.4865 [90]	
C_9H_{14} **1-Buten-1-ylcyclo-pentene-1** 		59 to 62 [90] @ 14mm	0.833 [90] @ 19°	1.4850 [90] @ 19°	

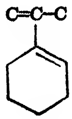
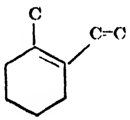
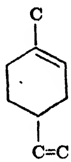
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-2-isopropenylcyclopentene-1 		155 to 157 [34]	0.8515 [34]	1.4892 [34]	
1-Methyl-3-isopropenylcyclopentene-1 or -5 		150 [36]			
3-Methyl-4-isopropenylcyclopentene-1 		143 to 145 [36] @ 770mm			

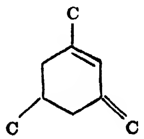
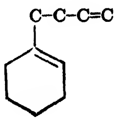
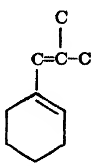
Name and Carbon Skeleton	M. P., °C	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Methyl-1-buten-3-ylcyclopentene-*x* 		168 to 169 [21]	0.8377 [21] @ 18.5°	1.4665 [21] @ 18.5°	
***d*-3-Methylene-4-methyl-5-isopropyl-cyclopentene-1** 		169 to 173 [80] 50 to 54 [80] @ 10mm		1.470 [80]	
2,3,3-Trimethyl-4-ethenylcyclopentene-1 		157 to 158 [12]			

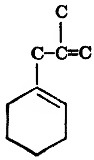
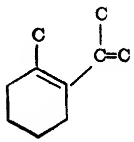
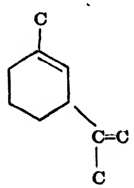
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,3,3-Trimethyl-4-isopropenylcyclopentene-1					
		177 to 179 [67] @ 754mm			
$C_{12}H_{20}$					
2-Methyl-1-(2,3,3-trimethylcyclopenten-1-yl)-propene-1					
		188 to 190 [11]	0.8311 [11] @ 16° 0.8421 [11] @ 0°	1.46707 [11] @ 16°	
$C_{14}H_{24}$					
2-Ethyl-1-(2,3,3-trimethylcyclopenten-1-yl)-butene-1					
		222 to 224 [11]	0.8688 [11] @ 19° 0.8814 [11] @ 0°	1.46875 [11]	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Ethenylcyclohexene-1 		145 [18] 143 to 145 [43] 36 @ 23mm [33]	0.8701 [43] D_0^{20} 0.8523 [33] @ 16° 0.8862 [43] D_0^0	1.49060 [43] 1.4677 [33] @ 16° 1.46423 [33] $n^{16}_{H_\alpha}$ 1.48812 [33] $n^{16}_{H_\beta}$	
4-Ethenylcyclohexene-1 		130 [52] @ 773mm 129.5 to 130.5 [53] 65 to 66 [53] @ 100mm 50 @ 50mm [52]	0.8310 [52] 0.8320 [53] 0.8484 [53] @ 0°	1.46529 [53] @ 20.1° 1.46380 [52]	$\frac{dD}{dt} = -0.0008_5$/°C. (0° to 20°)
3-Methylene-1-methyl-cyclohexene-1 		134 to 138 [5]	0.8389 [5] @ 18.8°	1.48723 [5] 1.48274 [5] $n^{17}_{H_\alpha}$ 1.49872 [5] $n^{17}_{H_\beta}$ 1.50910 [5] $n^{17}_{H_\gamma}$	

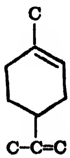
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Methylene-2-methyl-cyclohexene-1 		135.5 [35]	0.8521 [35]	1.4925 [35]	
C_9H_{14} **1-Cyclohexen-1-yl-propene-2 or 1-Cyclohexylidene-propene-2**  or 		159 to 161 [77]	0.8457 [77] 0.8468 [77] D_{20}^{20} 0.8611 [77] @ 0°		
1-Propen-2-ylcyclo-hexene-1 		158 to 159 [54] @ 755mm	0.8426 [54]	1.477 [54]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Isopropenylcyclo-hexene-1 		161 to 162 [64]			
1-Methyl-2-ethenyl-cyclohexene-1 		156 to 157 [18]			
1-Methyl-4-ethylidene-cyclohexene-1 or 1-Methyl-4-ethenyl-cyclohexene-1  or 		160 to 163 [100]	0.843 [100] @ 22°	1.47586 [100] @ 22°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,5-Dimethyl-3-methylenecyclohexene-1 		61 to 66 [8] @ 37mm 54 to 56 [8] @ 25mm	0.8280 [8] @ 20.1° 0.8300 [8] @ 17.1°	1.4809 [8] @ 20.2° 1.48151 [6,8] 1.47653 [8] $n^{20.2}_{H_\alpha}$ 1.49168 [8] $n^{20.2}_{H_\beta}$ 1.50159 [8] $n^{20.2}_{H_\gamma}$	
$C_{10}H_{16}$					
1-Buten-3-ylcyclohexene-1 		60 to 62 [55] @ 10mm	0.8445 [55] @ 18°	1.4745 [55] @ 18°	
2-Methyl-1-cyclohexen-1-ylpropene-1 		172 to 173 [35] 88 to 90 [35] @ 13mm	0.8537 [35]	1.4854 [35]	

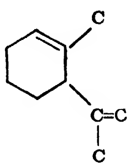
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2-Methyl-1-cyclohexen-1-ylpropene-2 			0.8607 [35]	1.4797 [35]	
1-Methyl-2-isopropenylcyclohexene-1 (*o*-Menthadiene) 		177 [44] @ 755mm			
***d*-1-Methyl-3-isopropenylcyclohexene-1** (Sylvestrene, carvestrene) 		176 to 177 [94] 175 to 178 [37,93] 175 to 176 [99] 173 to 175 [3]	0.8470 [94] 0.848 [99] 0.8485 [37] @ 18° 0.8510 [94] @ 16° 0.8612 [3] @ 16°	1.4752 [37] 1.47573 [99] 1.47799 [94] @ 18° 1.47468 [94] $n_{H_\alpha}^{18}$	$[\alpha]_D = +19.5°$ [3] $[\alpha]_D = +67.5°$ [37] $[\alpha]_D^{10} = +66.32°$ [99]

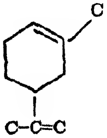
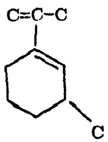
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
l-1-Methyl-3-isopropenylcyclohexene-1					$[\alpha]_D = -68.2°$ [37]
		176 to 178 [37]	0.848 [37] @ 19°	1.4761 [33]	
dl-1-Methyl-3-isopropenylcyclohexene-1					
		177 to 179 [7] @ 769mm 177.2 to 178.2 [7] @ 767.5mm 176 to 177.5 [7] @ 764mm 179 [24] 178 [10] 175 to 180 [3] 174 to 177.5 [1] 173 to 175 [92] 178 to 179 [66] @ 750mm	0.8453 [1] 0.8486 [7] @ 17.2°	1.47506 [1] 1.47717 [7] @ 17.2° 1.47380 [7] $n_{H_\alpha}^{17.2}$ 1.48505 [7] $n_{H_\beta}^{17.2}$ 1.49245 [7] $n_{H_\gamma}^{17.2}$	

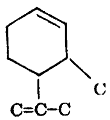
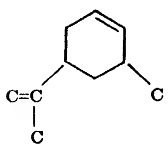
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
1-Methyl-4-isopropylidenecyclohexene-1 (*p*-Menthadiene) (Terpinolene) 		186 [40] @ 764mm 185 to 190 [93] 184 to 188 [46] 184 to 187 [15] 183 to 185 [83] 181 to 185 [98] 121 [83] @ 112mm 75 @ 15mm [40] 72 @ 10mm [40] 67 to 68 [83] @ 10mm	0.854 [83] 0.857 [46] 0.8583 [15] 0.8633 [40] D^{15}_{15}	1.48017 [15] 1.484 [83]	
***d*-1-Methyl-4-isopropenylcyclohexene-1** (*p*-Menthadiene) (*d*-Limonene) 	−96.6 [85]	180 to 182 [4] @ 765mm 175.5 to 176 [14] @ 763mm 179.5 to 180.5 [4] 178 to 179 [60] 178 [85] 177.6 to 178.0 [7] 176 to 177.4 [17] 176 to 177 [17] 176 to 176.7 [17] 176 to 176.4 [13] 176 [62] 175 to 177 [91] 175 [93] 174 to 176 [42]	0.7135 [79] @ 176.5° 0.8356 [17] @ 30° 0.8417 [27] @ 25° 0.8409 [59] @ 25° 0.8437 [60] D^{25}_{25} 0.8402 [14] @ 21° 0.8425 [30] 0.8456 [49] 0.846 [62] 0.8441 [30] D^{20}_{20} 0.8425 [7] @ 19.6°	1.4681 [17] @ 30° 1.4720 [27] @ 25° 1.4725 [59] @ 25° 1.47428 [14] @ 21° 1.4727 [7] @ 19.6° 1.473 [73] @ 17° 1.4771 [42] @ 14° 1.49116 [4] @ 13.4° 1.47124 [14] $n^{21}_{H_\alpha}$	$[\alpha]^{30}_D = +100.2°$ [17] † $[\alpha]^{20}_D = +126.84°$ [13] $[\alpha]^{20}_D = +122.47°$ [27] $[\alpha]^{19.5}_D = +104.25°$ [14] $[\alpha]_D = +124°$ [73] $[\alpha]_D = +123.6°$ [26] $[\alpha]_D = +122.7°$ [27] $[\alpha]_D = +120.466°$ [49] †Average of several experimental values.

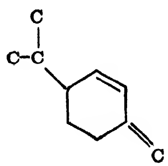
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***d*-1-Methyl-4-iso-propenylcyclohexene-1** (*Continued*)		177.5 [30] @ 759mm 177.6 to 177.8 [73] @ 755mm 176.5 [79] @ 753.7mm 177 [30] @ 745mm 71 @ 20mm [59] 64.4 [73] @ 15mm	0.8464 [4] @ 18° 0.8532 [60] @ 15.6° 0.8498 [60] D_{15}^{15} 0.8468 [7] @ 14.7° 0.8532 [60] D_{10}^{10} 0.8530 [79] @ 9.8° 0.8576 [60] D_4^4 0.8584 [30] @ 0° 0.8585 [30] D_0^0	1.48342 [4] $n_{H_\alpha}^{19}$ 1.47489 [7] $n_{H_\alpha}^{14.7}$ 1.48658 [4] $n_{H_\alpha}^{13.4}$ 1.48223 [14] $n_{H_\beta}^{21}$ 1.49796 [4] $n_{H_\beta}^{19}$ 1.48277 [7] $n_{H_\beta}^{14.7}$ 1.50109 [4] $n_{H_\beta}^{13.4}$ 1.48886 [14] $n_{H_\gamma}^{21}$ 1.50739 [4] $n_{H_\gamma}^{19}$ 1.49062 [7] $n_{H_\gamma}^{14.7}$ 1.51031 [4] $n_{H_\gamma}^{13.4}$	

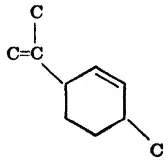
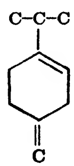
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_{4}	n^{20}_{D}	*Additional Data*
l-1-Methyl-4-isopropenylcyclohexene-1 (*l*-Limonene)		175.5 to 176.5 [14] @ 763mm 176 to 176.4 [13] 175.5 to 177 [53] 175 to 176 [95] 177.6 to 177.8 [66] @ 755mm 64.4 [73] @ 15mm	0.8453 [60] D^{25}_{25} 0.8417 [73] @ 20.6° 0.8407 [14] @ 20.5° 0.8422 [13] 0.846 [95] 0.8483 [60] D^{20}_{20} 0.8514 [60] D^{15}_{15} 0.8472 [73] @ 14° 0.8549 [60] D^{10}_{10}	1.47468 [14] @ 20.5° 1.47459 [95] 1.4727 [73] @ 17.2° 1.4740 [73] @ 14° 1.47157 [14] $n^{20.5}_{H_\alpha}$ 1.48256 [14] $n^{20.5}_{H_\beta}$ 1.48924 [14] $n^{20.5}_{H_\gamma}$	$[\alpha]^{20}_{D} = -122.6°$ [13] $[\alpha]^{19.5}_{D} = -101.5°$ [14] $[\alpha]^{18}_{D} = -121°$ [73] $[\alpha]_{D} = -103.51°$ [60]
dl-1-Methyl-4-isopropenylcyclohexene-1 (*dl*-Limonene) (Dipentene)		175.5 to 176.5 [14] @ 763mm 180 to 182 [93] 180 to 181 [45] 178 to 180 [9] 178 [73,94] 177 [86] 176 to 178 [19] 175 to 178 [89] 175 to 176 [27] 174 to 175 [46] 64.4 [14] @ 15mm	0.7962 [22] @ 78.3° 0.8486 [45] D^{25}_{25} 0.8402 [14] @ 20.85° 0.844 [27] 0.845 [46,86,94] 0.8535 [19] 0.8450 [22] @ 16.6° 0.8548 [45] D^{15}_{15} 0.85457 [45] @ 14.4°	1.47443 [14] @ 20.85° 1.47194 [27] 1.4746 [46] 1.47644 [94] 1.4727 [73] @ 18° 1.48013 [19] @ 16° 1.44279 [22] $n^{78.3}_{H_\alpha}$ 1.47134 [14] $n^{20.85}_{H_\alpha}$ 1.47308 [94] $n^{20}_{H_\alpha}$	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
dl-1-Methyl-4-isopropenylcyclohexene-1 (*Continued*)					
			0.8627 [45] D_4^4 0.8657 [19] @ 0°	1.47172 [22] $n_{H_\alpha}^{16.6}$ 1.47056 [45] $n_{H_\alpha}^{14.4}$ 1.45328 [22] $n_{H_\beta}^{18.3}$ 1.48231 [14] $n_{H_\beta}^{20.85}$ 1.48291 [22] $n_{H_\beta}^{16.6}$ 1.48629 [45] $n_{H_\beta}^{14.4}$ 1.45965 [22] $n_{H_\gamma}^{78.3}$ 1.48898 [14] $n_{H_\gamma}^{20.85}$ 1.48961 [22] $n_{H_\gamma}^{16.6}$ 1.49367 [45] $n_{H_\gamma}^{14.4}$	
2-Methyl-3-isopropenylcyclohexene-1					
(*o*-Menthadiene-1,8*a*) 		170 to 171 [62] @ 765mm	0.8481 [62] D_{20}^{20}	1.4758 [62]	

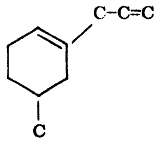
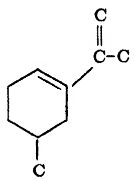
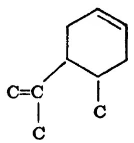
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2-Methyl-4-iso-propenylcyclohexene-1					
(*m*-Menthadiene-1,8*a*, Isocarvestrene, Diprene) 		176 to 177 [24] @ 765mm 171.5 to 173 [2] @ 752mm 68.5 to 69 [2] @ 16mm	0.8481 [2,24] 0.8476 [2] 0.8496 [24] D_{20}^{20}	1.49660 [2] @ 23.4° 1.46946 [2] 1.47799 [24] 1.49090 [24] 1.49893 [24]	
***d*-3-Methyl-1-iso-propenylcyclohexene-1**					$[\alpha]_D = +17.5°$ [56]
(*m*-Menthadiene) 		181 [38] @ 736mm 179 [56] @ 730mm	0.864 [38] D_{17}^{17}	1.4946 [38,56]	$[\alpha]_D = +64.0°$ [38]
***l*-3-Methyl-1-isopro-penylcyclohexene-1**					$[\alpha]_D = -12.9°$ [56]
		181 to 182 [56]		1.4972 [56]	

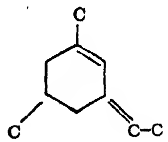
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
dl-3-Methyl-1-isopropenylcyclohexene-1		182 to 183 [38] @ 770mm 187 [65] @ 765mm 181 to 182 [58] 184 [29] @ 745mm	0.8549 [29] @ 22° 0.8609 [56] D_{20}^{20} 0.8624 [38] D_{20}^{20}	1.5015 [29] @ 25° 1.4975 [56] 1.5030 [38]	
3-Methyl-4-isopropenylcyclohexene-1 (o-Menthadiene) 		170 to 171 [62] @ 765mm	0.8490 [62] D_{17}^{17}	1.4778 [62]	
d-3-Methyl-5-isopropenylcyclohexene-1 		175 to 176 [61]			$[\alpha]_D^{17} = +29.6°$ [61]

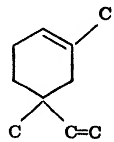
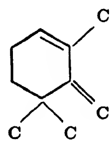
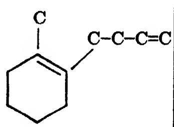
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
l-3-Methyl-5-iso-propenylcyclohexene-1		175 to 176 [61]			$[\alpha]_D^{16} = -25.3°$ [61]
dl-3-Methyl-5-iso-propenylcyclohexene-1		175 to 176 [61] @ 765mm			
3-Methylene-6-iso-propylcyclohexene-1 (p-Menthadiene, β-Phellandrene) 		171 to 172 [69] @ 766mm 171 to 172 [25] 57 @ 11mm [25]	0.8520 [25] 0.8558 [69] @ 10°	1.4788 [25]	$[\alpha]_D = +18.54°$ [25] $[\alpha]_D = +17.60°$ [69]

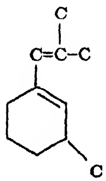
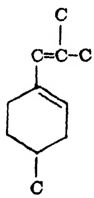
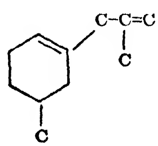
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
d-3-Methyl-6-iso-propenylcyclohexene-1 (*p*-Menthadiene) 		172 to 174 [88] 171 to 173 [20] @ 750mm	0.838 [20] @ 22.5° 0.8382 [88] @ 20.5°	1.4692 [20] @ 22.5° 1.4697 [88] @ 20.5° 1.4659 [20] $n_{H_\alpha}^{22.5}$ 1.4775 [20] $n_{H_\beta}^{22.5}$	$[\alpha]_D^{20} = +131.93°$ [88] $[\alpha]_{578}^{20} = +133.50°$ [20] $[\alpha]_{546}^{20} = +153.4°$ [17]
l-3-Methyl-6-iso-propenylcyclohexene-1		172.5 to 173.5 [87] 172 to 172.5 [70] @ 745mm	0.8370 [70] 0.8390 [70] @ 19.5°	1.47043 [87] 1.47643 [70] 1.4750 [70] @ 19.5°	$[\alpha]_D = -140.58°$ [87] $[\alpha]_D = -5.92°$ [70]
4-Methylene-1-iso-propylcyclohexene-1 (*p*-Menthadiene, β-Terpinene) 		173 to 174 [97]	0.838 [97] @ 22° 0.840 [97] @ 22°	1.4754 [97] @ 22° 1.4751 [97] @ 22°	

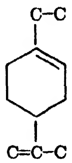
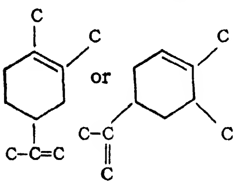
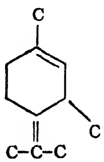
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
d-4-Methyl-1-iso-propenylcyclohexene-1 (p-Menthadiene) 		184 to 185 [16,68] @ 776mm 174 to 177 [82] 184 [45] @ 756mm 183 to 185.5 [28] @ 755mm 182 to 184 [20] @ 750mm 182 to 183 [45] @ 748mm 76 @ 14mm [28] 69 @ 14mm [32] 62 to 65 [82] @ 14mm	0.8574 [45] D_{25}^{25} 0.8679 [28] @ 24° 0.8420 [82] 0.851 [20] 0.858 [68] 0.8649 [16] D_{16}^{16} 0.8634 [45] D_{15}^{15} 0.8585 [32] @ 14.2° 0.86483 [45] @ 12.7° 0.8712 [45] @ 4°	1.4957 [28] @ 24° 1.48422 [82] 1.4965 [16] 1.4915 [68] 1.4876 [20] @ 19.8° 1.4966 [32] @ 14.2°	$[\alpha]_D = +100°$ [16] $[\alpha]_{578}^{20} = +118.33°$ [20] $[\alpha]_D^{18} = +98.2°$ [45] $[\alpha]_D^{14.2} = +140.6°$ [32]
dl-4-Methyl-1-iso-propenylcyclohexene-1		184 to 185 [45]	0.83579 [45] D_{20}^{20} 0.8390 [45] D_{15}^{15} 0.8425 [45] D_{10}^{10}	1.46945 [45] $n_{H_\alpha}^{17.2}$ 1.48113 [45] $n_{H_\beta}^{17.2}$ 1.48824 [45] $n_{H_\gamma}^{17.2}$	

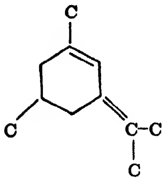
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
***d*-4-Methyl-2-propen-2-ylcyclohexene-1** (*o*-Menthadiene) 		171 to 173 [78]	0.8361 [78]		$[\alpha]_D = +52.84°$ [78]
***d*-4-Methyl-2-isopropenylcyclohexene-1** 		187 [65] @ 765mm 181 to 182 [56] 179 [57] @ 730mm	0.8609 [56] D_{20}^{20}	1.4972 [57] 1.4975 [56]	$[\alpha]_D = +17.5°$ [57]
***cis*-4-Methyl-5-isopropenylcyclohexene-1** 		169 to 170 [63] @ 762mm	0.8507 [63] D_{20}^{20}	1.4825 [63]	

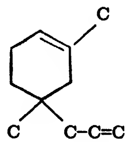
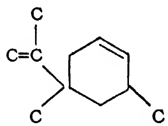
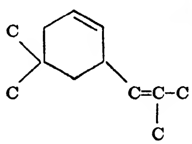
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
trans-4-Methyl-5-isopropenylcyclohexene-1		170 [63]	0.8477 [63] D_{20}^{20}	1.4749 [63]	
1,5-Dimethyl-3-ethylidenecyclohexene-1 		175 to 178 [6] @ 753mm	0.8360 [6,74] @ 21.3° 0.8332 [5] 0.8516 [74]	1.4868 [6] @ 19.9° 1.48092 [6] @ 17.7° 1.48255 [6] $n_{H_\alpha}^{19.9}$ 1.47701 [6] $n_{H_\alpha}^{17.7}$ 1.49748 [6] $n_{H_\beta}^{19.9}$ 1.49070 [6] $n_{H_\beta}^{17.7}$ 1.50720 [6] $n_{H_\gamma}^{19.9}$ 1.49930 [6] $n_{H_\gamma}^{17.7}$	

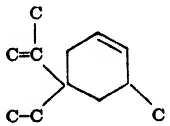
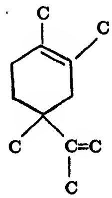
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,4-Dimethyl-4-ethenylcyclohexene-1 		160 to 161 [51] 44 @ 9 mm [51]	0.8331 [51] D_0^{20} 0.8481 [51] D_0^0	1.46581 [51] @ 19.7° 1.46230 [51] $n_{H_\alpha}^{19.7}$ 1.47204 [51] $n_{H_\beta}^{19.7}$ 1.47964 [51] $n_{H_\gamma}^{19.7}$	
2,4,4-Trimethyl-3-methylenecyclohexene-1 		48.5 to 49 [50] @ 11mm	0.843 [50] @ 21°	1.4772 [50] @ 21°	
$C_{11}H_{18}$ **1-Methyl-2-buten-3-ylcyclohexene-1** 		75 to 78 [41] @ 10mm	0.8769 [41] @ 15.5°	1.4853 [41] @ 15.5°	

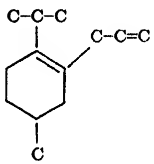
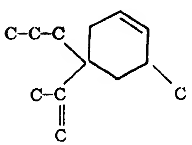
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
d-2-Methyl-1-(3-methyl-cyclohexen-1-yl)-propene-1 		192 to 193 [35]	0.8531 [35] @ 15°	1.4802 [35] @ 15°	$[\alpha]_D = +54.8°$ [35]
d-2-Methyl-1-(4-methyl-cyclohexen-1-yl)-propene-1 		190 to 191 [35]	0.8445 [35] @ 15°	1.4793 [35]	$[\alpha]_D = +63.9°$ [35]
4-Methyl-2-(2-methyl-propen-2-yl)-cyclohexene-1 		191 to 192 [35]	0.846 [35] @ 15°	1.4768 [35]	$[\alpha]_D = +68.8°$ [35]

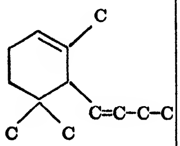
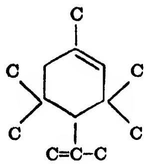
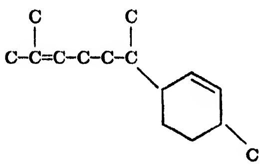
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Ethyl-4-isopropenyl-cyclohexene-1 		201 to 202 [96]	0.8545 [96] @ 18°	1.4802 [96] @ 18°	
1,2-Dimethyl-4-iso-propenyl-cyclohexene-1 or 2,3-Dimethyl-5-iso-propenyl-cyclohexene-1 		72 @ 9mm [74]	0.8576 [74]	1.46502 [74]	$[\alpha]_D^{20} = -55.44°$ [74] $[\alpha]_D^{20} = -47.55°$ [74]
1,3-Dimethyl-4-iso-propylidene-cyclo-hexene-1 		71 to 73 [75] @ 16mm	0.8402 [75]	1.47252 [75]	$[\alpha]_D^{20} = -96.89°$ [75] $[\alpha]_D^{20} = -81.41°$ [75]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5-Dimethyl-3-isopropylidene-cyclohexene-1					
		191 to 196[6]	0.8561[6] @ 23.6°	1.49367[6] @ 23.2°	
		106 to 109[6] @ 46mm	0.8465[6] @ 22.4°	1.49519[6] @ 22.5°	
		99 to 103[6] @ 36mm	0.8395[6] @ 21.4°	1.48521[6] @ 19.1°	
			0.8448[6] @ 19.0°	1.48559[6] @ 18.0°	
				1.48938[6] $n^{23.2}_{H_\alpha}$	
				1.49072[6] $n^{22.5}_{H_\alpha}$	
				1 48119[6] $n^{19.1}_{H_\alpha}$	
				1.48168[6] $n^{19.0}_{H_\alpha}$	
				1.50466[6] $n^{23.2}_{H_\beta}$	
				1.50674[6] $n^{22.5}_{H_\beta}$	
				1.49516[6] $n^{19.1}_{H_\beta}$	
				1.49564[6] $n^{18.0}_{H_\beta}$	
				1.51473[6] $n^{23.2}_{H_\gamma}$	
				1.51716[6] $n^{22.5}_{H_\gamma}$	
				1.50412[6] $n^{19.1}_{H_\gamma}$	
				1.50450[6] $n^{18.0}_{H_\gamma}$	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,4-Dimethyl-4-propen-2-ylcyclohexene-1 		182 to 185 [84] 183 to 185 [31] @ 741mm 67 to 69 [31] @ 9mm	0.8415 [84] @ 16° 0.8450 [31] @ 9.9° 0.8525 [31] @ 0°	1.47292 [84] @ 16° 1.47281 [31] @ 9.9°	
3,5-Dimethyl-5-iso-propenyl-cyclohexene-1 		184 to 186 [71] @ 737mm	0.8585 [71] @ 25°	1.4845 [71] @ 25°	
$C_{12}H_{20}$ **5,5-Dimethyl-3-(2-methylpropen-1-yl)-cyclohexene-1** 		195 to 196 [48]	0.8246 [48] @ 23°	1.4653 [48] @ 23°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_{4}	n^{20}_{D}	Additional Data
3-Methyl-5-ethyl-5-isopropenylcyclohexene-1 		199 to 202 [71] @ 759mm 83 to 85 [71] @ 15mm	0.8631 [71] @ 25°	1.4854 [71] @ 25°	
1,2,4-Trimethyl-4-isopropenylcyclohexene-1 		202 to 203 [23] @ 761mm 205 [72] 205 [51] @ 750mm 97 to 98 [72] @ 22mm 85 @ 13mm [51]	0.85322 [72] @ 25° 0.8597 [51] @ 20° 0.8626 [23] @ 16° 0.872 [72] @ 0° 0.8741 [51] @ 0°	1.47786 [72] @ 25° 1.48074 [51] @ 19.7° 1.4823 [23] @ 16° 1.47463 [72] $n^{20}_{H_\alpha}$ 1.47716 [51] $n^{19.7}_{H_\alpha}$ 1.48572 [72] $n^{25}_{H_\beta}$ 1.48796 [51] $n^{19.7}_{H_\beta}$ 1.49241 [72] $n^{25}_{H_\gamma}$ 1.49491 [51] $n^{19.7}_{H_\gamma}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
x,x,2-Trimethyl-4-isopropenylcyclohexene-1					
(Dimethyl diprene)		200.5 to 201.3 [2] @ 758mm; 87.8 to 88.3 [2] @ 12mm	0.8535 [2]	1.47915 [2]	
$C_{13}H_{22}$					
***d*-4-Methyl-2-propen-2-yl-1-isopropylcyclohexene-1**					$[\alpha]_D = +50.86°$ [78]
		214 to 217 [78]; 97 to 100 [78] @ 17mm	0.8551 [78]		
3-Methyl-5-n-propyl-5-isopropenylcyclohexene-1					
		104 to 106 [71] @ 14mm	0.8872 [71] @ 25°	1.4865 [71] @ 25°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,4,4-Trimethyl-3-buten-1-ylcyclohexene-1					
		220 to 221 [47] @ 747mm	0.8530 [47]	1.4784 [47]	
$C_{14}H_{24}$ **1,3,3,5,5-Pentamethyl-4-isopropenylcyclohexene-1**					
		122 to 123 [58] @ 29mm	0.8696 [58] @ 17° 0.8799 [58] @ 0°	1.48767 [58] @ 17°	
$C_{15}H_{26}$ **3-Methyl-6-(1,5-dimethylhexen-4-yl)-cyclohexene-1**					$[\alpha]_D = -37°$ [81]
(Dihydrozingiberene) 		135 to 136 [76] @ 15mm 122 to 125 [81] @ 7mm	0.8557 [81] @ 20° 0.865 [76] @ 15°	1.4837 [81] 1.4881 [76]	

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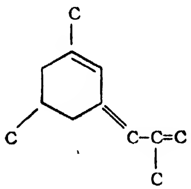
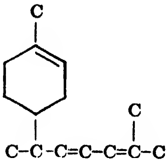
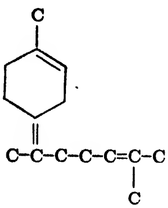
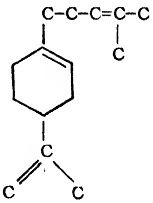
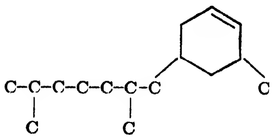
3. CYCLENES WITH TWO ALKENYL OR ONE ALKADIENYL SUBSTITUTIONS, C_nH_{2n-6}

$C_{12}H_{18}$

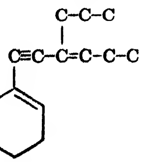
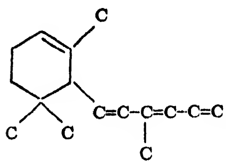
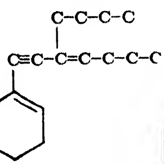
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,5-Dimethyl-3-(2-methylpropen-2-ylidene)-cyclohexene-1 		103 to 106 [1] @ 17mm	0.8619 [1] @ 22.2°	1.52159 [1] @ 22.3° 1.51543 [1] $n_{H_\alpha}^{22.3}$ 1.53781 [1] $n_{H_\beta}^{22.3}$ 1.55360 [1] $n_{H_\gamma}^{22.3}$	
$C_{13}H_{20}$					
1,3,3-Trimethyl-2-butadienylcyclohexene-*x*		108 to 110 [6] @ 15mm	0.8784 [6] @ 18°	1.5320 [6] @ 18°	
2,4,4-Trimethyl-3-butadien-*x*,*x*-yl-cyclohexene-*x*		96 to 97 [6] @ 16.5mm	0.8675 [6] @ 18°	1.5000 [6] @ 18°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-(1,5-dimethylhexadien-2,4-yl)-cyclohexene-1 (Zingiberene) 		160 to 161 [13] @ 327mm 137 to 139 [10] @ 17mm 128 to 130 [11] @ 12mm 128 to 129 [14] @ 9mm 119 to 123 [8] @ 3mm	0.8638 [8] D_{30}^{30} 0.8684 [14] 0.8731 [13] 0.874 [11] @ 17° 0.8733 [10] @ 16°	1.4870 [8] @ 30° 1.49399 [13] 1.4956 [14] 1.4975 [11] 1.4984 [10] @ 16° 1.49041 [13] $n_{H_\alpha}^{20}$ 1.50319 [13] $n_{H_\beta}^{20}$ 1.51112 [13] $n_{H_\gamma}^{20}$	$[\alpha]_D^{30} = -64.0°$ [8] $[\alpha]_D = -73.38°$ [12] $[\alpha]_D = -60°$ [10] $[\alpha]_D = -59.5°$ [11]
1-Methyl-4-(1,5-dimethylhexene-4-ylidene)-cyclohexene-1 (Bisabolene) 		262 to 263 [2,3] @ 756mm 261 to 262 [12] @ 752mm 261 to 262 [5] @ 751mm 133 to 134 [15] @ 12mm 131 [3] @ 9mm	0.8717 [15] @ 21° 0.873 [2] 0.8798 [12] 0.873 [3] @ 15° 0.8759 [5] @ 15°	1.4923 [15] @ 21° 1.4901 [5] 1.4935 [2] 1.4910 [3] @ 19.5°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
l-4-Isopropenyl-1-(4-methylpenten-3-yl)-cyclohexene-1					$[\alpha]_D = -10.59°$ [4]
(Cycloisopropenemyrcene) 		242 to 244 [4] 136 to 139 [9] @ 14mm 136 @ 11mm [4]	0.8817 [9] @ 19° 0.905 [4]	1.4915 [4] 1.4993 [9] @ 19°	
$C_{16}H_{26}$					
3-Methyl-5-(2,6-dimethylheptadien-x,x-yl)-cyclohexene-1 		143 to 144 [7] @ 15mm	0.923 [7] @ 18.5° 0.920 [7] @ 16.5°	1.4988 [7] @ 18.5° 1.5040 [7] @ 16.5°	

(1) K. v. Auwers and G. Peters, Ber. **43**, 3094, **1910.**
(2) Burgess and Co., Oct. **1909**, 24.
(3) H. Burgess and T. Page, J. Chem. Soc. **85**, 414, **1904.**
(4) H. Dieterle and P. H. Kaiser, Arch. Pharm. **270**, 413, **1932.**
(5) E. Gildemeister, and W. Müller through O. Wallach, "Festschrift," p. 414.
(6) J. Kandel, Compt. rend. **205**, 994, **1937.**
(7) E. Knoevenagel, J. prakt. Chem. [2] **97**, 288, **1918.**
(8) K. Moudgill, J. Indian Chem. Soc. **5**, 251, **1928.**
(9) L. Ruzicka and W. Bosch, Helv. Chim. Acta **14**, 1336, **1931.**
(10) L. Ruzicka, J. Meyer, and M. Mingazzini, Helv. Chim. Acta **5**, 345, **1922.**
(11) L. Ruzicka and A. G. van Veen, Ann. **468**, 143, **1929.**
(12) Schimmel and Co., Oct. **1909.**
(13) O. Schreiner and R. Kremers, Pharm. Arch. **4**, 141, **1901.**
(14) F. W. Semmler and A. Becker, Ber. **46**, 1814, **1913.**
(15) J. L. Simonsen, "The Terpenes," Vol. **2**, p. 493, London, Cambridge University Press, **1932.**

4. CYCLENES WITH AN ALKENE-ALKYNE OR ALKATRIENE SUBSTITUTION, C_nH_{2n-8}

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
$C_{15}H_{22}$					
1-(3-Propylhexen-3-yne-1)-cyclohexene-1					
		98 to 100 [2] @ 2mm	0.8796 [2]	1.5160 [2]	
$C_{16}H_{24}$					
2,4,4-Trimethyl-3-(3-methylhexatrien-1,3,5-yl)-cyclohexene-1					
		127 to 130 [1] @ 10mm			
$C_{17}H_{26}$					
1-(3-Butylhepten-3-yne-1)-cyclohexene-1					
		112 to 113 [2] @ 2mm	0.8724 [2]	1.5110 [2]	

(1) P. Karrer, H. Salomon, R. Morf, and O. Walker, Helv. Chim. Acta **15**, 878, 1932.
(2) G. A. Nesty and C. S. Marvel, J. Am. Chem. Soc. **59**, 2662, 1937.

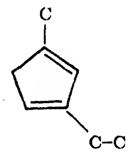
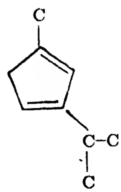
IX. CYCLODIENES OR CYCLODIOLEFINS

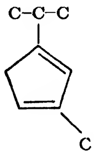
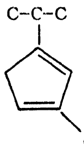
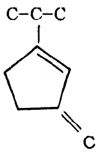
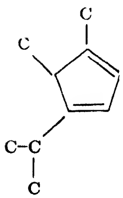
1. Cyclodienes with alkyl substitutions, C_nH_{2n-4}
2. Cyclodienes with an alkenyl or olefin substitution, C_nH_{2n-6}

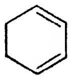
1. CYCLODIENES OR CYCLODIOLEFINS WITH ALKYL SUBSTITUTIONS, C_nH_{2n-4}

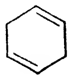
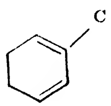
C_5H_6

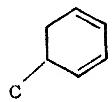
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclopentadiene 	−85 [81]	42.5 [26] 40 [81] 41 [56] 41.5 to 42 [82] 41 [110] @ 757mm 40.2 to 41.6 [4] @ 757mm 40.2 to 40.8 [4] @ 757mm 40 to 41 [34] @ 755mm 40 [83] @ 715mm	0.803 [26] 0.7983 [110] @ 19.5° 0.80475 [56] @ 18.6° 0.8070 [4] @ 16.1° 0.8085 [4] @ 16.1° 0.8071 [27] @ 15.7° 0.81500 [56] D_{15}^{15} 0.8083 [27] @ 14.1°	1.4398 [110] @ 19.5° 1.4446 [56] @ 18.6° 1.44627 [4] @ 16.1° 1.44632 [4] @ 16.1° 1.44113 [82] $n_{H_\alpha}^{20}$ 1.44252 [4] $n_{H_\alpha}^{16.1}$ 1.44378 [27] $n_{H_\alpha}^{15.7}$ 1.44443 [27] $n_{H_\alpha}^{14.1}$ 1.45380 [82] $n_{H_\beta}^{20}$ 1.45533 [4] $n_{H_\beta}^{16.1}$ 1.45662 [27] $n_{H_\beta}^{15.7}$ 1.457332 [27] $n_{H_\beta}^{14.1}$ 1.46318 [4] $n_{H_\gamma}^{16.1}$ 1.46353 [4] $n_{H_\gamma}^{16.1}$ 1.46462 [27] $n_{H_\gamma}^{15.7}$ 1.46539 [27] $n_{H_\gamma}^{14.1}$	

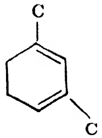
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
x-Methylcyclopenta-diene-x,x		69 to 70 [110] @ 736mm	0.8200 [110] @ 18°	1.4460 [110] @ 18°	
C_8H_{12} **1-Methyl-3-ethyl-cyclopentadiene-1,3** 		135 [23]			
C_9H_{14} **1-Methyl-3-isopropyl-cyclopentadiene-1,3** 		152 to 158 [85] 50 to 55 [85] @ 20mm	0.840 [85]	1.4758 [85]	

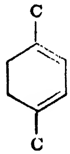
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Methyl-1-isopropyl-cyclopentadiene-1,3 		147 to 149 [84]	0.825 [84] @ 15°	1.4630 [84] @ 15°	
3-Methyl-1-isopropyl-cyclopentadiene-1,3- or 3-Methylene-1-iso-propyl-cyclopentene-1  or 		166 to 167 [96]	0.845 [96] @ 21°	1.4913 [96]	
$C_{10}H_{16}$ **1,5-Dimethyl-4-iso-propylcyclopenta-diene-1,3** (Isothujene) (Tanacetene) 		172 to 175 [90] 171 to 178 [55] 171 to 176 [54] 170 to 172 [91] 60 to 63 [74] @ 14mm	0.8386 [55] @ 22° 0.836 [91] 0.840 [87,90] 0.8408 [74] 0.8400 [54] @ 17°	1.47145 [91] 1.4761 [90] 1.476 [74] 1.47674 [55] 1.4789 [54] @ 17°	$[\alpha]_D = -1.9°$ [55]

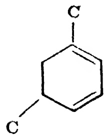
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclohexadiene-1,3 		81.5 [39] 81 to 82 [33,112] 81 [19] 80.5 to 81 [49] 80.13 [17] 80 to 81 [105] 80 [30] 79.8 to 80 [111] 80.5 to 80.7 [101] @ 752mm 83 to 84 [78] @ 750mm 79 to 80 [52] @ 750mm 79 to 80 [108] @ 736mm	0.8296 [21] D_{25}^{25} 0.8347 [52] @ 22° 0.840 [19] 0.8410 [49] 0.8413 [17] 0.8451 [104] 0.8478 [15] 0.8503 [39] D_{19}^{19} 0.8340 [108] @ 18.5° 0.8421 [30] @ 16° 0.8489 [104] @ 16° 0.84785 [33] @ 15.5° 0.83659 [21] @ 15.4° 0.8377 [21] D_{15}^{15} 0.84987 [33] D_{15}^{15} 0.8454 [78] @ 10° 0.8476 [21] @ 4°	1.4679 [52] @ 22° 1.4742 [17] 1.4699 [15] 1.4755 [49] 1.4628 [108] @ 18.5° 1.4788 [112] @ 18° 1.4760 [30] @ 16° 1.4766 [104] @ 16° 1.47254 [33] $n_{H_\alpha}^{15.5}$ 1.46371 [21] $n_{H_\alpha}^{15.4}$ 1.48687 [33] $n_{H_\beta}^{15.5}$ 1.47672 [21] $n_{H_\beta}^{15.4}$ 1.49589 [33] $n_{H_\gamma}^{15.5}$ 1.48493 [21] $n_{H_\gamma}^{15.4}$	

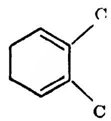
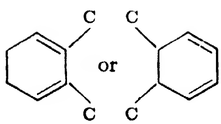
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclohexadiene-1,4 		88.4 to 89.4 [104] @ 769mm 85.5 [105] 85 to 87 [111] 84 to 86 [11] 86 to 87 [78] @ 750mm 78 to 79 [111] @ 750mm	0.8357 [39] D_{25}^{25} 0.8569 [104] 0.8471 [105] 0.8519 [105] @ 15° 0.8605 [78] @ 10°	1.46806 [39] @ 25° 1.4679 [111] 1.4729 [105] 1.4781 [104] @ 15.2°	
Cyclohexadiene-*x*,*x*		82 to 83 [31] 82 to 84 [16] @ 718mm	0.8466 [16] @ 21.2° 0.846 [31] 0.8478 [16]	1.47296 [16] @ 21.2° 1.46921 [16] $n_{H_\alpha}^{21.2}$ 1.48258 [16] $n_{H_\beta}^{21.2}$ 1.49092 [16] * $n_{H_\gamma}^{21.2}$	*Index of refraction for other wave lengths given by author. [16]
C_7H_{10} **2-Methylcyclo-hexadiene-1,3** 		110 [106] @ 741mm	0.8292 [106, 107]	1.4710 [106, 107]	

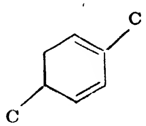
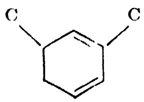
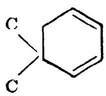
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
d-5-Methylcyclo-hexadiene-1,3 		105.5 to 106 [105]	0.8274 [105]	1.4680 [105]	
5-Methylcyclohexa-diene-1,3		100.5 to 101.5 [38] @ 762mm	0.8252 [38] @ 22.5°	1.46619 [38] @ 22.5° 1.46225 [38] $n_{H_\alpha}^{22.5}$ 1.48519 [38] $n_{H_\gamma}^{22.5}$	
x-Methylcyclohexa-diene-1,3		108 to 110 [65] 106 to 107 [53]	0.7970 [65] 0.8014 [53] @ 18.3° 0.8088 [53] @ 15°	1.4444 [65] 1.4460 [53] @ 18.3°	

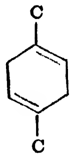
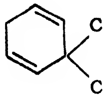
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,3-Dimethylcyclohexadiene-1,3					
(Dihydro-*m*-xylene)		135 to 137 [65]	0.8324 [65]	1.441 [87] @ 23°	
		135 to 136 [43]	0.8373 [43]	1.4697 [65]	
		133 to 135 [3]	0.8389 [65]	1.4787 [65]	
		133 to 134 [3]	0.8270 [3] @ 17.6°	1.4856 [43]	
		132 to 135 [3]	0.8356 [3] @ 16.6°	1.46621 [3] @ 17.3°	
		131 [87]	0.8365 [3] @ 16.2°	1.47368 [3] @ 16.6°	
				1.47388 [3] @ 16.2°	
				1.46621 [3] $n_{H_\alpha}^{17.3}$	
				1.46959 [3] $n_{H_\alpha}^{16.6}$	
				1.46994 [3] $n_{H_\alpha}^{16.2}$	
				1.47934 [3] $n_{H_\beta}^{17.3}$	
				1.48249 [3] $n_{H_\beta}^{16.6}$	
				1.48287 [3] $n_{H_\beta}^{16.2}$	
				1.48646 [3] $n_{H_\gamma}^{17.3}$	
				1.49053 [3] $n_{H_\gamma}^{16.6}$	
				1.49180 [3] $n_{H_\gamma}^{16.2}$	

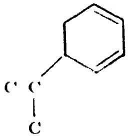
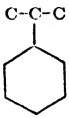
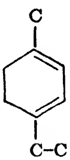
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,4-Dimethylcyclo-hexadiene-1,3 		135 to 138 [5] 29.7 to 30 [70] @ 13mm 29.5 to 29.9 [70] @ 11mm	0.8306 [5] @ 19° 0.8358 [70] @ 16.3° 0.8366 [6] @ 15.5°	1.47921 [70] 1.47966 [5] @ 19° 1.49380 [6] @ 16.1° 1.49385 [6] @ 15.7° 1.47535 [5] $n^{19}_{H_\alpha}$ 1.47554 [70] $n^{16.3}_{H_\alpha}$ 1.48219 [6] $n^{16.1}_{H_\alpha}$ 1.47793 [6] $n^{15.7}_{H_\alpha}$ 1.49129 [5] $n^{19}_{H_\beta}$ 1.49079 [70] $n^{16.3}_{H_\beta}$ 1.49380 [6] $n^{16.1}_{H_\beta}$ 1.49385 [6] $n^{15.7}_{H_\beta}$ 1.50191 [5] $n^{19}_{H_\gamma}$ 1.50074 [70] $n^{16.3}_{H_\gamma}$ 1.50459 [6] $n^{16.1}_{H_\gamma}$ 1.50445 [6] $n^{15.7}_{H_\gamma}$	

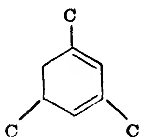
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,5-Dimethylcyclo-hexadiene-1,3					
		128 to 130[39]	0.821[7]	1.471[7]	
		128 to 129[7]	0.8229[7] @ 19.8°	1.47212[7] @ 19.7°	
		124 to 126[7] @ 756mm	0.8189[7] @ 19.7°	1.46877[7] @ 19.5°	
		130 to 132.3[7] @ 754mm	0.8205[7] @ 18.4°	1.46946[7] @ 18.9°	
		128 to 130[7] @ 754mm	0.8221[7] @ 18°	1.47103[7] @ 18.7°	
		126.8 to 128[7] @ 754mm	0.8203[39] D_{18}^{18}	1.46360[39] @ 18°	
		126 to 128[35] @ 750mm	0.8272[7] @ 16.2°	1.47466[7] @ 16.0°	
				1.467[7] $n_{H_\alpha}^{20}$	
				1.46828[7] $n_{H_\alpha}^{19.7}$	
				1.46493[7] $n_{H_\alpha}^{19.5}$	
				1.46561[7] $n_{H_\alpha}^{18.9}$	
				1.46719[7] $n_{H_\alpha}^{18.7}$	
				1.47052[7] $n_{H_\alpha}^{16.0}$	
				1.48214[7] $n_{H_\beta}^{19.7}$	
				1.47850[7] $n_{H_\beta}^{19.5}$	
				1.47939[7] $n_{H_\beta}^{18.9}$	
				1.48096[7] $n_{H_\beta}^{18.7}$	
				1.48476[7] $n_{H_\beta}^{16.0}$	
				1.49096[7] $n_{H_\gamma}^{19.7}$	

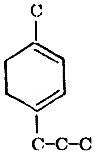
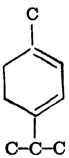
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,5-Dimethylcyclohexadiene-1,3 (*Continued*)				1.48725 [7] $n^{19.5}_{H_\gamma}$ 1.48821 [7] $n^{18.9}_{H_\gamma}$ 1.48978 [7] $n^{18.7}_{H_\gamma}$ 1.49367 [7] $n^{16.0}_{H_\gamma}$	
2,3-Dimethylcyclohexadiene-1,3 		135.5 [43]	0.8521 [43]	1.4895 [43]	
2,3 or 5,6-Dimethylcyclohexadiene-1,3 (Karanthrene) 		138 to 139 [72] 135.5 [43] 134 to 137 [59] 134 to 135 [62] 134 [63]	0.8373 [59] 0.8521 [43] 0.8531 [72] @ 18.6°	1.4692 [59] 1.4895 [43] 1.49118 [39] 1.4848 [72] @ 18.6° 1.4966 [39] @ 18°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
2,5-Dimethylcyclo-hexadiene-1,3 		132.5 to 133.5 [106,107] 131.5 to 132.5 [106,107] @ 740mm	0.8223 [106, 107]	1.4675 [106, 107]	
2,6-Dimethylcyclo-hexadiene-1,3 		129 to 130 [106] @ 745mm	0.8225 [106] 0.8268 [106] @ 15°	1.4675 [106]	$[\alpha]_D = 27.38°$ [106]
5,5-Dimethylcyclo-hexadiene-1,3 		111 [20] @ 770mm 110 to 111 [39]	0.810_3 0.8083 [61] D_{25}^{25} 0.8117 [61] D_{20}^{20} 0.814 [39] D_{18}^{18} 0.8153 [61] D_{15}^{15} 0.81573 [61] @ 14° 0.8193 [61] D_{10}^{10} 0.8246 [61] @ 4°	1.45630 [39] @ 18° 1.45482 [61] $n_{H_\alpha}^{14}$ 1.46733 [61] $n_{H_\beta}^{14}$ 1.47530 [61] $n_{H_\gamma}^{14}$	$\frac{dD}{dt} = -0.0008_7$/°C. (5° to 25°)

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4-Dimethylcyclo-hexadiene-1,4 		133 to 134 [9] @ 720mm			
3,3-Dimethylcyclo-hexadiene-1,4 			0.8421 [39] @ 18° 0.8433 [39] D_{18}^{18}	1.47691 [39] @ 18°	
1,3-Dimethylcyclo-hexadiene-*x*,*x*		133 to 134 [93] 132 to 134 [89]	0.8275 [89]	1.4675 [89]	
x*,*x*-Dimethylcyclo-hexadiene-*x*,*x		123 [53]	0.7948 [53] @ 20.5° 0.7998 [53] @ 15°	1.4416 [53] @ 20.5°	

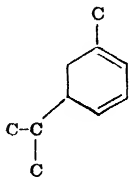
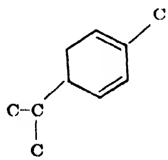
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
5-Isopropylcyclo-hexadiene-1,3 		165 to 167 [84]	0.846 [84]	1.495 [84]	
1-Isopropylcyclo-hexadiene-*x*,*x* 		140 [77]	0.8142 [77]	1.4628 [77]	
1-Methyl-4-ethylcyclo-hexadiene-1,3 		160.9 to 161.2 [2] @ 761mm 159.5 to 160 [4] @ 751mm 51 to 51.2 [70] @ 14mm 46 [70] @ 12mm	0.8371 [2] @ 19.5° 0.8408 [2] @ 18.8° 0.8393 [2] @ 18.4° 0.8408 [70] @ 15.6° 0.8411 [70] @ 15.2°	1.48413 [70] 1.48250 [2] 1.48181 [2] @ 19.9° 1.49263 [2] @ 18° 1.47828 [2] $n^{20}_{H_\alpha}$ 1.47750 [2] $n^{19.9}_{H_\alpha}$ 1.47823 [2] $n^{18}_{H_\alpha}$ 1.48002 [70] $n^{15.6}_{H_\alpha}$ 1.49353 [2] $n^{20}_{H_\beta}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-ethylcyclo-hexadiene-1,3 (*Continued*)					
				1.49294 [2] $n_{H_\beta}^{19.9}$	
				1.49345 [2] $n_{H_\beta}^{18}$	
				1.49537 [70] $n_{H_\beta}^{15.6}$	
				1.50422 [2] $n_{H_\gamma}^{20}$	
				1.50371 [2] $n_{H_\gamma}^{19.9}$	
				1.50347 [2] $n_{H_\gamma}^{18}$	
				1.50574 [70] $n_{H_\gamma}^{15.6}$	
1,3,5-Trimethylcyclo-hexadiene-*x*,*x*					
(Dihydromesitylene) 		166 to 168 [65] 147 [93]	0.8454 [65] 0.8475 [65] 0.826 [93] @ 18°	1.4773 [65] 1.4810 [65]	

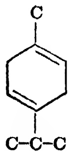
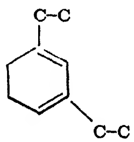
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-4-propyl-cyclohexadiene-1,3 		65.4 to 66 [70] @ 13.5mm 62 to 72 [98] @ 6mm	0.8353 [70] 0.8713 [98] @ 15° 0.8726 [98] D_0^{15}	1.47942 [70] @ 18.9° 1.48761 [98] @ 15° 1.47535 [70] $n_{H_\alpha}^{18.9}$ 1.49013 [70] $n_{H_\beta}^{18.9}$ 1.49979 [70] $n_{H_\gamma}^{18.9}$	
1-Methyl-4-isopropyl-cyclohexadiene-1,3 (α-Terpinene) 		174 to 176 [36] @ 766mm 163 to 166 [64] @ 765mm 179 to 181 [94] 179 to 180.5 [8] 174.8 to 175.2 [76] 173.5 to 175 [67] @ 755mm 173.5 to 174.8 [69] @ 755mm 174.8 to 175.4 [1] @ 750mm 160 to 164 [64] @ 750mm 174 to 176 [1] @ 742mm 68 to 70 [41] @ 15mm 62 @ 15mm [67]	0.8441 [36] D_{27}^{27} 0.8529 [25] D_{21}^{23} 0.8443 [79] @ 20.2° 0.834 [76] 0.845 [75,76] 0.846 [94] 0.8361 [2] @ 19.6° 0.8375 [69] @ 19.6° 0.8353 [70] @ 18.9° 0.8411 [39] @ 18.5° 0.8423 [39] $D_{18.5}^{18.5}$ 0.8474 [42] $D_{18.5}^{18.5}$ 0.8382 [69] @ 18.3°	1.48451 [36] @ 27° 1.4748 [25] @ 23° 1.49065 [79] @ 20.2° 1.4784 [75] 1.4789 [94] 1.480 [64] 1.4905 [75,76] 1.477 [67,69] @ 19.7° 1.47810 [1] @ 19.4° 1.47942 [70] @ 18.9° 1.48724 [42] @ 18.5° 1.48579 [41] @ 18° 1.48005 [1] @ 16.9°	

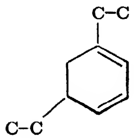
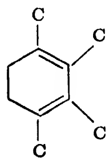
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-4-isopropyl-cyclohexadiene-1,3 (*Continued*)					
		65.4 to 66 [70] @ 13.5mm	0.838 [67] @ 18°	1.48107 [1] @ 16.6°	
		60 to 63 [42] @ 12mm	0.8453 [41] @ 18°	1.48015 [1] @ 15.8°	
		59 to 62 [75] @ 10mm	0.8361 [1] @ 16.2°	1.48722 [2] @ 14.8°	
		59 to 60 [1] @ 11.5mm	0.8372 [1] @ 16°	1.48218 [1] @ 13°	
		61.5 to 62.5 [76] @ 10mm	0.8389 [1] @ 16°	1.48822 [2] @ 12.5°	
			0.8408 [1] @ 16°	1.49070 [2] @ 12.5°	
			0.847 [84] @ 16°	1.48643 [79] $n_{H_\alpha}^{20.2}$	
			0.8504 [2] @ 16°	1.47359 [1] $n_{H_\alpha}^{19.4}$	
			0.8538 [2] @ 12.9°	1.47535 [1] $n_{H_\alpha}^{18.9}$	
			0.8561 [2] @ 12.1°	1.48333 [1] $n_{H_\alpha}^{18.5}$	
				1.47535 [1] $n_{H_\alpha}^{16.9}$	
				1.47637 [1] $n_{H_\alpha}^{16.6}$	
				1.47603 [1] $n_{H_\alpha}^{15.8}$	
				1.48273 [2] $n_{H_\alpha}^{14.3}$	
				1.47807 [1] $n_{H_\alpha}^{13}$	
				1.48393 [2] $n_{H_\alpha}^{12.5}$	
				1.48655 [2] $n_{H_\alpha}^{12.5}$	
				1.50169 [79] $n_{H_\beta}^{20.2}$	
				1.48837 [1] $n_{H_\beta}^{19.4}$	

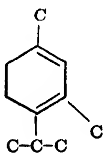
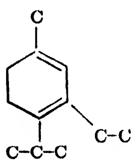
Name and Carbon Skeleton	M. P.,°C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-isopropyl-cyclohexadiene-1,3 (*Continued*)					
				1.49013 [1] $n_{H_\beta}^{18.9}$	
				1.49022 [1] $n_{H_\beta}^{16.6}$	
				1.49707 [2] $n_{H_\beta}^{14.8}$	
				1.49286 [1] $n_{H_\beta}^{13}$	
				1.49828 [2] $n_{H_\gamma}^{12.5}$	
				1.50087 [2] $n_{H_\gamma}^{12.5}$	
				1.51166 [79] $n_{H_\gamma}^{20.2}$	
				1.49795 [1] $n_{H_\gamma}^{19.4}$	
				1.49979 [1] $n_{H_\gamma}^{18.9}$	
				1.50701 [1] $n_{H_\gamma}^{18.5}$	
				1.50006 [1] $n_{H_\gamma}^{16.9}$	
				1.50064 [1] $n_{H_\gamma}^{16.6}$	
				1.50018 [1] $n_{H_\gamma}^{15.8}$	
				1.50631 [2] $n_{H_\gamma}^{14.8}$	
				1.50254 [1] $n_{H_\gamma}^{13}$	
				1.50744 [2] $n_{H_\gamma}^{12.5}$	
				1.51031 [2] $n_{H_\gamma}^{12.5}$	

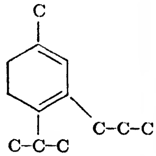
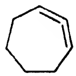
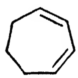
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-5-isopropyl-cyclohexadiene-1,3 		169 to 171 [47]	0.8515 [47] D_{20}^{20}	1.47270 [47]	
2-Methyl-5-isopropyl-cyclohexadiene-1,3 (*d*-α-Phellandrene) 		175 to 176 [72,74] 172 to 173.5 [18] 89.3 to 90.8 [18] @ 56.5mm 70 [40] @ 15mm 66 [40] @ 14mm 61 [97] @ 11mm	0.8324 [18] @ 30° 0.8473 [40] @ 21° 0.844 [86] 0.8447 [40] 0.8440 [97] @ 19° 0.8565 [74] @ 15°	1.4695 [18] @ 30° 1.48825 [40] @ 21° 1.48345 [40] 1.4732 [97] @ 19°	$[\alpha]_D = +44.66°$ [88] $[\alpha]_D = +45°$ [40] $\frac{dD}{dt} = -0.0023/°C.$ (15° to 25°)

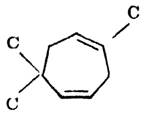
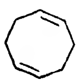
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
2-Methyl-5-isopropyl-cyclohexadiene-1,3					$[\alpha]_D = -115°$ [67]
					$[\alpha]^{20}_D = -112.76°$ [80]
(*l*-α-Phellandrene)		174 to 177 [4] @ 759mm	0.8459 [60] @ 30°	1.466 [60] @ 30°	$[\alpha]^{20}_D = -112°$ [80]
		171 to 172 [80] @ 758.2mm	0.8372 [80] @ 25°	1.4725 [80] @ 25°	$[\alpha]^{30}_D = -18.37°$ [60]
		173 to 175 [60] @ 758mm	0.8387 [80] @ 25°	1.47697 [5] @ 22°	
		173 to 175 [67] @ 754mm	0.8426 [5] @ 22°	1.4732 [80]	
				1.488 [92] @ 19°	
		67 to 68 [80] @ 22mm	0.8410 [80]		
			0.8425 [80]	1.4737 [69] @ 17.5°	
		65.2 to 66 [5,8] @ 17mm	0.8465 [92] @ 19°	1.47746 [5] @ 17.1°	
		64 to 66 [57] @ 17mm	0.8490 [5] @ 17.1°	1.48014 [57] @ 17°	
		58 to 59 [80] @ 16mm	0.844 [67] @ 15°	1.47328 [5] $n^{22}_{H_\alpha}$	
		60 to 60.5 [67,69] @ 15mm	0.8448 [57] @ 15°	1.47418 [5] $n^{17.1}_{H_\alpha}$	
		65 [92] @ 12mm		1.48624 [5] $n^{22}_{H_\beta}$	
				1.48580 [5] $n^{17.1}_{H_\beta}$	
				1.49447 [5] $n^{22}_{H_\gamma}$	
				1.49287 [5] $n^{17.1}_{H_\gamma}$	
***dl*-α-Phellandrene**					$[\alpha]_D = +4.12°$ [95]
		175 to 176 [95]	0.841 [95] @ 22°	1.4760 [95] @ 22°	

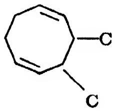
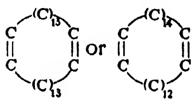
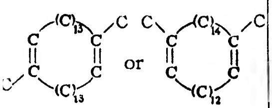
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-4-isopropyl-cyclohexadiene-1,4					$[\alpha]_D = +2.5°$ [68]
(γ-Terpinene, Moslene)		183 [67,69]	0.849 [67,69]	1.4783 [109] @ 21°	
		179 to 181 [51]	0.846 [51]	1.4789 [51]	
		179 [48]	0.8515 [68]	1.4779 [48]	
		178.5 to 180.5 [91] @ 740mm	D_{16}^{16} 0.853 [69] @ 15°	1.4785 [68] @ 18°	
		174 [10]		1.4754 [71] @ 15.6°	
		69 to 73 [68] @ 20mm		1.4765 [67,69] @ 14.5°	
		72.5 [67,69] @ 18mm		1.4720 [71] $n_{H_\alpha}^{15.6}$	
		65.5 to 68 [109] @ 14mm		1.4827 [71] $n_{H_\beta}^{15.6}$	
				1.4894 [71] $n_{H_\gamma}^{15.6}$	
Methyl-isopropyl-cyclohexadiene		171 to 172 [53]	0.8170 [53] @ 15.5°	1.4564 [53] @ 15.5°	
1,3-Diethylcyclo-hexadiene-1,3 		68 @ 9mm [14]			

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5-Diethylcyclohexadiene-1,3 		166 to 168 [45]	0.8659 [45] D_{20}^{20}	1.47575 [45]	
1,2-Diethylcyclohexadiene-*x*,*x*		60 to 63 [74] @ 14mm	0.8408 [74]	1.476 [74]	
1,2,3,4-Tetramethylcyclohexadiene-1,3 		180 to 182 [65]	0.8482 [65] 0.8516 [65]	1.4816 [65] 1.4850 [65]	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
1-Methyl-4-isopropyl-cyclohexadiene-*x*,*x*					$[\alpha]^{20}_D = +8.40°$ [13]
		173.5 [45]	0.8272 [46]	1.464 [46]	
		172 to 174 [46,50]	0.8337 [45]	1.46430 [46]	
		75 to 80 [13] @ 9mm	0.8491 [13]	1.46539 [45]	
			0.8408 [50] D^{20}_{20}	1.49824 [13]	
			0.8540 [50] D^{0}_{0}		
$C_{11}H_{18}$					
1,3-Dimethyl-4-iso-propylcyclo-hexadiene-1,3					$[\alpha]^{16}_D = +0.04°$ [66]
		184 to 186 [66] @ 737mm	0.8585 [66] @ 25°	1.4845 [66] @ 25°	
$C_{12}H_{20}$					
1-Methyl-3-ethyl-4-isopropylcyclo-hexadiene-1,3					$[\alpha]^{16}_D = +0.07°$ [66]
		199 to 202 [66] @ 737mm; 83 to 85 [66] @ 15mm	0.8631 [66] @ 25°	1.4854 [66] @ 25°	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-3-propyl-4-isopropylcyclohexadiene-1,3					
		104 to 106 [66] @ 14mm	0.8872 [66] @ 25°	1.4865 [66] @ 25°	
C_7H_{10} **Cycloheptadiene-1,2**					
		118 to 119 [32]	0.8532 [32]		
Cycloheptadiene-1,3					*Index of refraction values for other wave lengths given by ref. (29).
		120 to 121 [58] 120 to 121 [101] @ 724mm 118 to 119 [101] @ 720mm 118 to 119 [99] @ 715mm	0.8679 [29] @ 17.6° 0.8859 [28] @ 12.4° 0.8809 [100, 101] @ 0° 0.8815 [101] @ 0° 0.8823 [100] @ 0° 0.8929 [99] @ 0°	1.50066 [28] $n_{H_\alpha}^{12.4}$ 1.51663 [28] $n_{H_\beta}^{12.4}$ 1.49597 [29] $n_{H_\alpha}^{17.6}$ 1.51202 [29] $n_{H_\beta}^{17.6}$ *	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,6,6-Trimethylcyclo-heptadiene-1,4 (Euterpene) 		161 to 165 [12]			
C_8H_{12} **Cycloöctadiene-1,3** 		39.5 [102] @ 16.5mm	0.884 [103] @ 0°		
Cycloöctadiene-1,4 or -1,5  or 		143 to 144 [103]	0.887 [103] @ 0°		
Cycloöctadiene-1,5 		50 to 52 [22] @ 17mm	0.8564 [22] @ 20.7°	1.49646 [22] @ 20.7°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,4-Dimethylcyclo-öctadiene-1,5 		68 to 71 [22] @ 15mm	0.8623 [22] @ 13°	1.49036 [22] @ 13°	
$C_{30}H_{56}$ **Cyclotriacontadiene-1,16 or -1,15** 	50 to 52 [73]	240 [73] @ 0.4mm	0.8218 [73] @ 80°	1.4564 [73] @ 80°	
$C_{32}H_{60}$ **1,16-Dimethylcyclo-triacontadiene-1,16 or -1,15** 	64 to 65 [73]	250 @ 1mm [73]	0.8302 [73] @ 80°	1.4641 [73] @ 80° *	*Several values for *He* listed [73]

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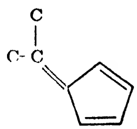
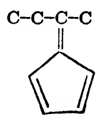
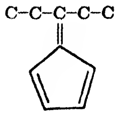
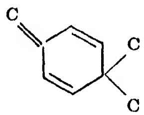
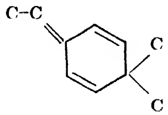
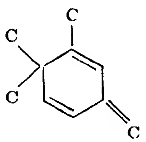
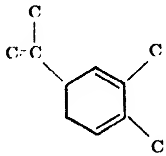
2. CYCLODIENES WITH AN ALKENYL OR OLEFIN SUBSTITUTION, C_nH_{2n-6}

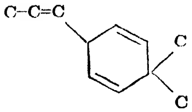
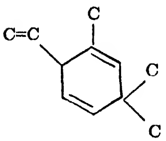
C_8H_{10}

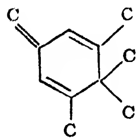
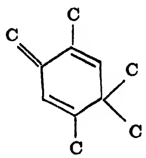
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
5-Isopropylidenecyclo-pentadiene-1,3 (Dimethylfulvene) 		153 to 154 [12] @ 717mm 46 [12] @ 11mm	0.881 [14] 0.8858 [12] @ 17°	1.54740 [14] 1.53913 [14] $n_{H_\alpha}^{20}$ 1.56918 [14] $n_{H_\beta}^{20}$	
C_9H_{12} **3-Cyclopentadien-2,4-ylidenebutane** (Methylethylfulvene) 		185 [6] *ca* 87.4 to 87.9 [2] @ 40mm 62.5 [13] @ 13mm 27 to 29 [14] @ 0.08 to 0.15mm	0.8772 [2] @ 20.9° 0.878 [14] 0.879 [14]	1.53702 [2] @ 20.9° 1.5375 [14] 1.5377 [14] 1.52988 [1] $n_{H_\alpha}^{20.9}$ 1.50325 [14] $n_{H_\alpha}^{20}$ 1.50326 [14] $n_{H_\alpha}^{20}$ 1.55856 [14] $n_{H_\beta}^{20}$ 1.55857 [14] $n_{H_\beta}^{20}$	

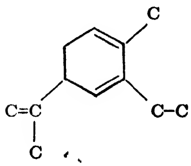
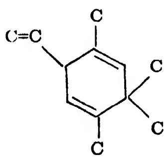
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3-Cyclopentadien-2,4-ylidenepentane					
(Diethylfulvene)		96.8 to 97.2 [13] @ 40mm	0.8812 [2] @ 16.4°	1.52997 [2] @ 16.4°	
		74.5 to 78.5 [1] @ 19mm			
C_9H_{12}					
6-Methylene-3,3-dimethylcyclohexadiene-1,4					
		38 to 40 [4] @ 15mm	0.8360 [3] @ 15.8°	1.50295 [3] @ 15.8°	
			0.8430 [3] @ 15.2°	1.5086 [3] @ 14.95°	

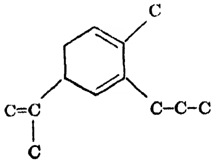
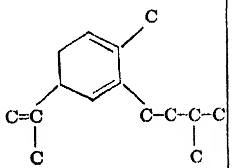
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,3-Dimethyl-6-ethylidenecyclohexadiene-1,4 		81.5 to 84 [4] @ 25mm 71 to 73 [3] @ 16mm	0.857 [4] 0.8614 [4] @ 15.5° 0.8613 [4] @ 12.8°	1.51572 [4] @ 15.15° 1.51477 [4] @ 14.7° 1.51072 [4] $n_{H_\alpha}^{15.15}$ 1.50982 [4] $n_{H_\alpha}^{14.7}$ 1.53015 [4] $n_{H_\beta}^{15.15}$ 1.52946 [4] $n_{H_\beta}^{14.7}$ 1.54300 [4] $n_{H_\gamma}^{15.15}$ 1.54221 [4] $n_{H_\gamma}^{14.7}$	
$C_{10}H_{14}$ **3-Methylene-1,6,6-trimethylcyclohexadiene-1,4** 		60 to 65 [4] @ 15mm	0.8735 [4] @ 10.7°	1.51813 [4] @ 10.7° 1.51331 [4] $n_{H_\alpha}^{10.7}$ 1.53213 [4] $n_{H_\beta}^{10.7}$ 1.54435 [4] $n_{H_\gamma}^{10.7}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,3-Dimethyl-6-isopropenylcyclohexadiene-1,3					$[\alpha]_D^{21} = +69.12°$ [7,8]
					$[\alpha]_D = 103.49°$ [9]
		197 [8] @ 746mm	0.8724 [8] @ 21.1°	1.5000 [8] @ 21.1°	
		90 to 91.5 [1] @ 21mm	0.8747 [9]	1.50152 [9]	
		89.2 to 89.4 [1] @ 18mm	0.8738 [1] @ 19°	1.49875 [1] @ 19.0°	
		82 to 83 [8] @ 15mm	0.8686 [1] @ 18.8°	1.50124 [1] @ 18.8°	
		75 to 76 [9] @ 10mm	0.8776 [7] @ 15°	1.50215 [7] @ 15°	
		72 to 73 [9] @ 8mm		1.49596 [1] $n_{H_\alpha}^{19.0}$	
				1.49451 [1] $n_{H_\alpha}^{18.8}$	
				1.49803 [7] $n_{H_\alpha}^{15}$	
				1.51100 [1] $n_{H_\beta}^{19.0}$	
				1.50888 [1] $n_{H_\beta}^{18.8}$	
				1.51260 [7] $n_{H_\beta}^{15}$	
				1.52071 [1] $n_{H_\gamma}^{19.0}$	
				1.51785 [1] $n_{H_\gamma}^{18.8}$	
				1.50124 [7] $n_{H_\gamma}^{15}$	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3,3-Dimethyl-6-propen-1-yl-cyclohexadiene-1,4 		83 to 85 [4] @ 13mm	0.8618 [4] @ 15.2°	1.50633 [4] @ 15.2° 1.50189 [4] $n_{H_\alpha}^{15.2}$ 1.51925 [4] $n_{H_\beta}^{15.2}$ 1.52040 [4] $n_{H_\gamma}^{15.2}$	
1,3,3-Trimethyl-6-ethenylcyclohexa-diene-1,4 		85 to 86 [4] @ 15mm	0.8844 [4] @ 12.7°	1.51931 [4] @ 12.7° 1.51470 [4] $n_{H_\alpha}^{12.7}$ 1.53230 [4] $n_{H_\beta}^{12.7}$ 1.54371 [4] $n_{H_\gamma}^{12.7}$	

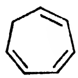
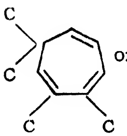
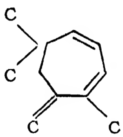
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_4	n^{20}_D	Additional Data
6-Methylene-2,3,3,4-tetramethylcyclohexa-diene-1,4 		89 to 90 [4] @ 15mm	0.8765 [4] @ 23.3°	1.51350 [4] @ 23.2° 1.50884 [4] $n^{23.2}_{H_\alpha}$ 1.52660 [4] $n^{23.2}_{H_\beta}$ 1.53830 [4] $n^{23.2}_{H_\gamma}$	
6-Methylene-1,3,3,4-tetramethylcyclohexa-diene-1,4 		77 @ 12mm [4]	0.8809 [4] @ 15.2°	1.51687 [4] @ 15.2° 1.51235 [4] $n^{15.2}_{H_\alpha}$ 1.53006 [4] $n^{15.2}_{H_\beta}$ 1.54172 [4] $n^{15.2}_{H_\gamma}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-3-ethyl-5-isopropenylcyclohexa-diene-1,3					$[\alpha]_D^{18} = +86.19°$ [7,8]
(2-Ethyl-*p*-menthatriene-2,6,8(9)) 		100 to 101 [8] @ 13.5mm	0.8859 [8] @ 18° 0.8880 [7] @ 15°	1.5041 [8] @ 18° 1.50847 [7] @ 15° 1.50429 [7] $n_{H_\alpha}^{15}$ 1.51920 [7] $n_{H_\beta}^{15}$ 1.52763 [7] $n_{H_\gamma}^{15}$	
1,3,3,4-Tetramethyl-6-ethenylcyclohexa-diene-1,4					
		100 to 103 [4] @ 18mm	0.8837 [4] @ 15.4°	1.51452 [4] @ 15.4° 1.51028 [4] $n_{H_\alpha}^{15.4}$ 1.52702 [4] $n_{H_\beta}^{15.4}$ 1.53796 [4] $n_{H_\gamma}^{15.4}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-3-propyl-5-isopropenylcyclohexa-diene-1,3					$[\alpha]_D^{22} = +86.20°$ [7]
(2-Propylmentha-triene-2,6,8(9)) 		107 to 108 [7] @ 13mm	0.8804 [7] @ 15°	1.50273 [7] @ 15° 1.49900 [7] $n_{H_\alpha}^{15}$ 1.51312 [7] $n_{H_\beta}^{15}$ 1.52141 [7] $n_{H_\gamma}^{15}$	
$C_{15}H_{24}$					
2-Methyl-5-isopro-penyl-3-(3-methyl-butyl)-cyclohexadiene-1,3					$[\alpha]_D^{20} = +18.5°$ [11] $[\alpha]_D^{20} = +18°$ [10]
		135 to 137 [10] @ 15mm 130 to 132 [11] @ 11mm	0.8679 [11] 0.8703 [10]	1.49478 [11] 1.4952 [10]	

(1) K. v. Auwers and F. Eisenlohr, Ber. 43, 827, 1910.
(2) K. v. Auwers and F. Eisenlohr, J. prakt. Chem. [2] 84, 1, 1911.
(3) K. v. Auwers and K. Müller, Ber. 44, 1595, 1911.
(4) K. v. Auwers and K. Ziegler, Ann. 425, 217, 1921.
(5) C. Courtot, Ann. chim. [9] 4, 58, 1915.
(6) C. Engler and W. Frankenstein, Ber. 34, 2933, 1901.
(7) A. Klages, Ber. 40, 2360, 1907.
(8) A. Klages and F. Sommer, Ber. 39, 2306, 1906.
(9) H. Rupe and F. Emmerich, Ber. 41, 1393, 1908.
(10) F. W. Semmler, K. G. Jonas, and K. Oelsner, Ber. 50, 1838, 1917.
(11) F. W. Semmler, K. G. Jonas, and A. Roenisch, Ber. 50, 1823, 1917.
(12) J. Thiele, Ber. 33, 666, 1900.
(13) J. Thiele and H. Balhorn, Ann. 348, 1, 1906.
(14) R. Willstätter and M. Heidelberger, Ber. 46, 517, 1913.

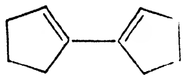
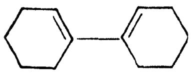
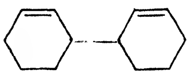
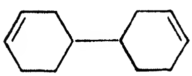
X. CYCLOTRIENES OR CYCLOTRIOLEFINS, C_nH_{2n-6}

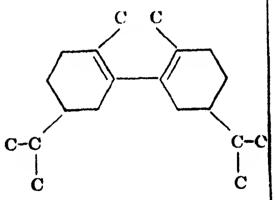
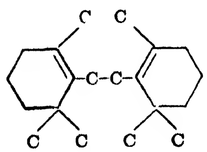
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cycloheptatriene-1,3,5 (Tropilidene) 	·	116[5] 115.5 to 116.5[4] 114[2] 117[4] @ 724mm	0.8929[1] @ 17.5° 0.9129[2] @ 0° 0.9082[1,4,5] @ 0°		
$C_{11}H_{16}$ **4,5,7,7-Tetramethyl-heptatriene-1,3,5** **or** **5-Methylene-4,4,7-tri-methylheptadiene-1,3**  or 		67 to 68[3] @ 11mm	0.8687[3]	1.50660[3]	

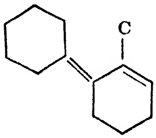
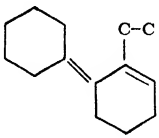
(1) K. v. Auwers and F. Eisenlohr, Ber. **43**, 827, 1910.
(2) A. Ladenburg, Ann. **217**, 74, 1883.
(3) H. Rupe and W. Kerkovius, Ber. **44**, 2702, 1911.
(4) R. Willstätter, Ann. **317**, 260, 1901.
(5) R. Willstätter, Ber. **34**, 129, 1901.

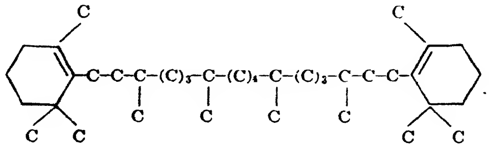
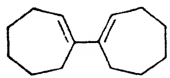
XI. DICYCLENES OR DICYCLOÖLEFINS

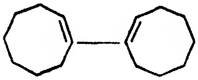
1. Dicyclenes with alkyl substitutions, C_nH_{2n-6}
2. Dicyclenes with an alkyne substitution, C_nH_{2n-10}

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Cyclopenten-1-ylcyclopentene-1					
(1,1′-Dicyclopentenyl)		208 [2]			
					
$C_{12}H_{18}$					
1-Cyclohexen-1-ylcyclohexene-1					
(1,1′-Dicyclohexenyl)	28 [2]	245 to 251 [2] 250 to 253 [9] 120 to 125 [9] @ 15mm	0.9485 [9]	1.5287 [9]	
					
1-Cyclohexen-2-ylcyclohexene-2					
(2,2′-Dicyclohexenyl)		234 [3]	0.9293 [3]	1.5090 [3]	*Author states that "The hydrocarbon was apparently an octahydrodiphenyl which was isomeric with the one having conjugated double bonds which has been described by Wallach."
					
1-Cyclohexen-3-ylcyclohexene-3					
(3,3′-Dicyclohexenyl)		230 to 232 [1]			
					

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-5-isopropyl-1-(2-methyl-5-isopropylcyclohexen-1-yl)-cyclohexene-1 		190 to 195 [10] @ 30mm	0.945 [10]	1.5172 [10]	
1,2-Di-(2,6,6-trimethylcyclohexen-1-yl)-ethane (Di-β-cyclogeranyl) 		116 [6]			

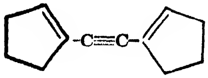
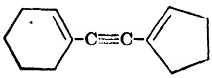
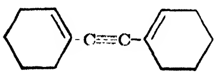
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1-Methyl-6-cyclohexylidenecyclohexene-1 		130 to 132 [4] @ 20mm	0.9282 [4] 0.9432 [4] @ 0°	1.5165 [4]	
$C_{14}H_{22}$ **1-Ethyl-6-cyclohexylidenecyclohexene-1** 		139 to 141 [4] @ 20mm	0.9308 [4] 0.9461 [4] @ 0°	1.5172 [4]	
3,3′-Dimethyldicyclohexenyl-*x*,*x*		265 to 267 [9]			

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,7,12,16-Tetramethyl-1,18-di-(2,6,6-trimethylcyclohexen-1-yl)-octadecane					$[\alpha]_D^{14} = +7.56°$ [8]
(Octadecahydrocarotene) 		276 [8] @ 1mm	0.8524 [8] @ 80.0° 0.8828 [8] @ 29.2°	1.4792 [8] @ 46° 1.4848 [8] @ 31° 1.4869 [8] @ 25°	
$C_{14}H_{22}$					
1-Cyclohepten-1-ylcycloheptene-1					
(1,1′-Dicycloheptenyl) 		149 to 150 [5] @ 19mm	0.9736 [5] @ 19°	1.526 [5] @ 19°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Cycloöcten-1-ylcyclo-öctene-1					
(1,1′-Dicycloöctenyl) 	36 to 37 [7]	115 to 116 [7] @ 0.25mm	0.9630 [7] @ 21.8°	1.5353 [7] @ 24°	

(1) K. Alder and H. F. Rickert, Ber. **71**, 373, **1938.**
(2) E. de B. Barnett and C. A. Lawrence, J. Chem. Soc. **1935,** 1104.
(3) D. S. Frederick, H. D. Cogan, and C. S. Marvel, J. Am. Chem. Soc. **56,** 1815, **1934.**
(4) C. E. Garland and E. E. Reid, J. Am. Chem. Soc. **47,** 2333, **1925.**
(5) M. Godchot and G. Cauquil, Compt. rend. **186,** 767, **1928.**
(6) R. Kuhn and M. Hoffer, Ber. **67,** 357, **1934.**
(7) L. Ruzicka and H. A. Boekenoogen, Helv. Chim. Acta, **14,** 1319, **1931.**
(8) J. H. C. Smith, J. Biol. Chem. **90,** 597, **1931.**
(9) O. Wallach, Ann. **381,** 95, **1911.**
(10) O. Wallach, Ann. **403,** 73, **1914.**

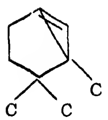
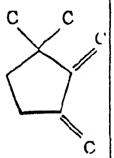
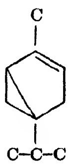
2. DICYCLENES WITH AN ALKYNE SUBSTITUTION, C_nH_{2n-10}

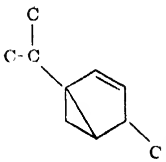
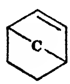
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Dicyclopenten-1-ylacetylene					
	58.5 to 60 [1]	105 to 110 [1] @ 2mm			
$C_{13}H_{16}$ Cyclohexen-1-yl-cyclopenten-1-ylacetylene					
		103 to 104 [3] @ 2.5mm	0.9610 [3]	1.5582 [3]	
$C_{14}H_{18}$ Dicyclohexen-1-ylacetylene					
		158 to 159 [4] @ 12mm 126 to 128 [3] @ 3mm 105 to 110 [2] @ 1.5mm	0.9934 [3] 0.9604 [4] D_{13}^{13}	1.5520 [3] 1.5549 [2] 1.55768 [4] @ 13°	

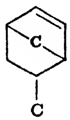
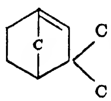
(1) P. S. Pinkney and C. S. Marvel, J. Am. Chem. Soc. **59, 2669, 1937.**
(2) P. S. Pinkney, G. A. Nesty, D. E. Pearson, and C. S. Marvel, J. Am. Chem. Soc. **59, 2666, 1937.**
(3) P. S. Pinkney, G. A. Nesty, R. H. Wiley, and C. S. Marvel, J. Am. Chem. Soc. **58,** 972, **1936.**
(4) Ju. Salkind and N. Schuwalow, J. Gen. Chem. (U.S.S.R.) **7, 1235, 1937.**

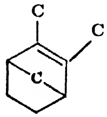
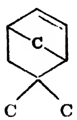
XII. BICYCLENES OR BICYCLOÖLEFINS

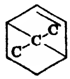
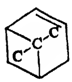
1. Bicyclenes with alkyl substitutions, C_nH_{2n-4}
2. Bicyclenes with an alkenyl substitution, C_nH_{2n-6}

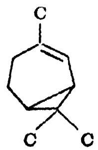
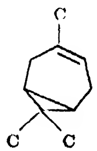
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
[0,2,2]-Bicyclo-hexene-*x* 		230 to 232 [40] 103 @ 8mm [40]			
C_9H_{14} **3,4,4-Trimethyl-[0,1,3]$^{(1,3)}$-bicyclo-hexene-1 or 2,3-Dimethylene-1,1-dimethylcyclo-pentane**  or 		127 to 128 [9] @ 757mm	0.8292 [9] @ 0°		
$C_{10}H_{16}$ ***d*-1-Methyl-4-iso-propyl-[0,1,3]$^{(4,6)}$-bi-cyclohexene-1** (α-Thujene) 		152 to 152.5 [102] @ 699mm 151 to 152 [67] 151 to 152 [85] @ 755mm	0.8314 [102] D_{30}^{30} 0.8262 [67] D_{20}^{20} 0.8294 [85] @ 17.4°	1.4502 [102] @ 30° 1.44909 [67] 1.45182 [85] @ 15.65° 1.44904 [85] $n_{H_\alpha}^{15.65}$ 1.45864 [85] $n_{H_\beta}^{15.65}$ 1.46434 [85] $n_{H_\gamma}^{15.65}$	$[\alpha]_D^{30} = +37.69°$ [102] $[\alpha]_D^{25} = +35.54°$ [67]

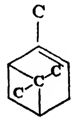
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
l-1-Methyl-4-iso-propyl-[0,1,3]$^{(4,6)}$-bi-cyclohexene-1 (α-Thujene)		152 to 152.3 [110] 151 to 153 [109] 151 to 152.5 [109] 151 [112] @ 759mm	0.8263 [109] 0.8275 [109, 110] 0.8301 [112]	1.45022 [109] 1.45042 [109, 110] 1.45150 [112]	$[\alpha]_D^{20} = -4.23°$ [109] $[\alpha]_D^{20} = -8.23°$ [110] $[\alpha]_D^{20} = -37.20°$ [112]
d-3-Methyl-6-iso-propyl-[0,1,3]$^{(4,6)}$-bicyclohexene-1 (β-Thujene) 		147.5 to 149.5 [68] 150 to 151 [110] @ 750mm 147 [112] @ 739mm	0.8232 [110] @ 22° 0.8208 [112] 0.8248 [110] 0.8220 [68] @ 16°	1.44842 [110] @ 22° 1.44708 [112] 1.44809 [68] @ 16°	$[\alpha]_D = +109.90°$ [68] $[\alpha]_D = +110.780°$ [112]
C_7H_{10} **[1,2,2]$^{(3,6)}$-Bicyclo-heptene-1** (Norbornylene) 	51 to 53 [54]				

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
4-Methyl-[1,2,2]$^{(3,6)}$-bicycloheptene-1					
(1-Methylnorcamphene-4) 		115.5 to 117 [120] @ 750mm	0.8668 [120] @ 18°	1.4606 [120] @ 18°	
C_9H_{14}					
3,3-Dimethyl-[1,2,2]$^{(1,4)}$-bicyclo-heptene-1					
(Camphenilene) 	26.5 [104]	138 to 140 [104] 142 [49]	0.8699 [104] @ 21°	1.4676 [104] @ 21°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,2-Dimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1 (Santene) 		140 to 142 [5,94] 140 to 141 [59] 139 to 140 [77] 136 to 140 [69] 38 to 39 [20] @ 15mm	0.863 [20] 0.865 [20] 0.8700 [59] @ 17° 0.8720 [94] @ 17° 0.8664 [94] @ 16° 0.8698 [5] @ 15° 0.871 [69] @ 15° 0.8710 [77] @ 15° 0.8657 [5] D_{15}^{15} 0.8680 [94] @ 14°	1.46539 [20] 1.4663 [20] 1.4688 [5] @ 17.5° 1.4699 [5] @ 17.5° 1.4657 [94] @ 17° 1.46758 [59] @ 17° 1.4676 [94] @ 16° 1.4710 [94] @ 14°	
α-Santene		140 [77]	0.870 [77] @ 15°		
4,4-Dimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1 (Apoisofenchene) 	24.5 to 25 [55]	134.5 to 135.5 [55] @ 762mm 140 to 142 [56] 136 to 138 [55]	0.8607 [55] @ 26° 0.8631 [55] 0.8642 [56]	1.45764 [55] @ 26° 1.46111 [56] 1.46023 [55]	

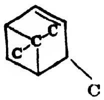
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
7,7-Dimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1 (Apobornylene) 	36 to 37 [63] 38 [73]	135 to 140 [55] 138 [73] 130 to 132 [56] @ 742mm	0.8543 [56]	1.45374 [73] @ 38.7° 1.45942 [56] 1.45151 [73] $n_{H_\alpha}^{38.7}$ 1.45998 [73] $n_{H_\beta}^{38.7}$ 1.46881 [73] $n_{H_\gamma}^{38.7}$	
7,7-Dimethyl-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1 (Apopinene) 		140 [58]	0.870 [58]	1.46700 [58]	

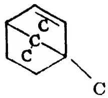
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D^{20}_{4}	n^{20}_{D}	Additional Data
1,4,4-Trimethyl-[0,1,4]$^{(3,5)}$-bicyclo-heptene-1 (Carene or Pinonene) 		172 to 173 [3] 167 to 170 [4] 165.5 to 167 [76] @ 707mm 165 to 170 [76] @ 685mm 64 @ 29mm [87]	0.8441 [87] @ 30° 0.8552 [76] D^{30}_{30} 0.8594 [100] D^{27}_{27} 0.8568 [3] @ 21° 0.8561 [4]	1.4717 [87] @ 30° 1.4731 [76] @ 30° 1 47536 [4]	$[\alpha]^{21}_{D} = +15.21°$ [3] $[\alpha]^{20}_{D} = +62.2°$ [76] $[\alpha]^{20}_{D} = +5.37°$ [4] $[\alpha]_{D} = +82.64°$ [87]
1,5,5-Trimethyl-[0,1,4]$^{(4,6)}$-bicyclo-heptene-1 (Carene or Isodiprene) 		170 [21] 165 to 172 [99] 163 to 167 [4] 168 to 169 [100] @ 705mm 123 to 124 [100] @ 200mm 60 @ 30mm [87]	0.8586 [100] D^{30}_{30} 0.8575 [87] @ 25° 0.8571 [4] 0.8563 [99] 0.861 [4] D^{20}_{20} 0.8610 [4] @ 18° 0.8668 [21] D^{15}_{15}	1 469 [100] @ 30° 1.4737 [99] 1.47009 [4] @ 18°	$[\alpha]_{D} = +14.45°$ [99]

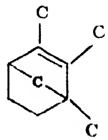
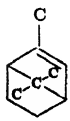
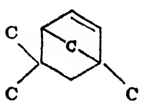
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_4	n^{20}_D	*Additional Data*
d-1,7,7-Trimethyl-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1				1.466_2	$[\alpha]_D = +53.75°$ [75]
					$[\alpha]_D = +51.52°$ [96]
(d-α-Pinene)		156 to 157 [43] @ 763mm	0.8542 [87] @ 25°	1.4634 [42] @ 25°	$[\alpha]_D = +51.14°$ [106]
		158.5 to 159 [88]	0.8543 [113*] @ 25°	1.4635 [113*] @ 25°	$[\alpha]_D = +48.85°$ [23]
		156 to 156.5 [105]	0.8582 [42] @ 25°	1.4645 [87] @ 25°	$[\alpha]_D = +47.9°$ [113*]
		156.0 to 156.1 [96]	0.8595 [88] D^{25}_{25}	1.4608 [105]	$[\alpha]_D = +47.89°$ [87]
		156 [33]	0.8584 [105]	1.46565 [33]	$[\alpha]_D = +47.48°$ [43]
		155 to 159 [75]	0.8585 [3,30]	1.4663 [79,106]	$[\alpha]_D = +33.37°$ [8]
		155 to 156 [1,106,107,108,113]	0.8591 [106]	1.470 [75]	$[\alpha]_D = +15.47°$ [88]
		155 [17]	0.8597 [79]	1.46634 [8] @ 18.05°	$[\alpha]^{18}_D = +45.04°$ [30]
		154.5 to 155 [79]	0.8624 [88] D^{20}_{20}	1.4663 [43] @ 15°	$[\alpha]^{17.6}_D = +41.32°$ [8]
		156.4 to 156.6 [8] @ 757mm	0.8594 [8] @ 18.05°	1.4684 [96] @ 15°	Reference [23] gives refractive indices for mercury lines.
		156 [30] @ 753mm	0.8620 [23,43] @ 15°	1.4685 [108] @ 15°	*Average of four determinations on same sample.
		62 @ 30mm [87]	0.8631 [96] @ 15°	1.46915 [17] @ 14°	$\frac{dn}{dt} = -0.0004_6$/°C. (15° to 25°)
		44 @ 14mm [17]	0.8642 [33] @ 15°	1.46929 [30] @ 13.8°	
		45 @ 12mm [3]	0.8643 [1] @ 15°	1.4650 [23] @ 12°	
			0.8654 [1] @ 15°	1.46354 [8] $n^{18.05}_{H_\alpha}$	
			0.8658 [88] D^{15}_{15}	1.47322 [8] $n^{18.05}_{H_\beta}$	
			0.8591 [17] @ 14°	1.47925 [8] $n^{18.05}_{H_\gamma}$	
			0.8694 [88] D^{10}_{10}		
			0.8732 [88] D^{5}_{5}		
			0.8740 [88] @ 4°		
			0.8703 [17] @ 0°		
			0.8746 [30] @ 0°		

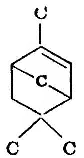
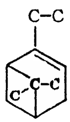
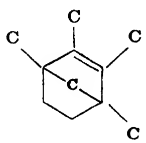
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D^{20}_{4}	n^{20}_{D}	*Additional Data*
l-1,7,7-Trimethyl-[1,1,3]$^{(4.6)}$-bicyclo-heptene-1 (l-α-Pinene)		156 to 157 [32] 156 [91] 155 to 156 [1, 106] 155 [29] 153.3 [22] 157.1 to 157.4 [8] @ 757.5mm 153.5 to 154.5 [86] @ 755mm 155.4 to 155.8 [15] @ 748.9mm 153 to 154 [100] @ 700mm	0.8107 [91] @ 78.59° 0.8259 [15] @ 61.4° 0.8277 [91] @ 59.38° 0.8327 [15] @ 53.2° 0.8439 [91] @ 39.74° 0.8525 [100] D^{27}_{27} 0.8590 [86] D^{25}_{25} 0.8565 [15] @ 24.1° 0.8570 [15] @ 23.5° 0.8582 [22] 0.8587 [29] 0.8598 [15,106] 0.8597 [32] D^{20}_{20} 0.8621 [8] @ 16.25° 0.8620 [23] @ 15° 0.8654 [1] @ 15° 0.8685 [91] @ 10° 0.8749 [29] @ 0° 0.8767 [91] @ 0°	1.44797 [15] @ 61.4° 1.45239 [15] @ 53.2° 1.4625 [100] @ 28° 1.4648 [91] @ 25° 1.4687 [86] @ 25° 1.46506 [15] @ 24.1° 1.46526 [15] @ 23.5° 1.4606 [22] 1.4660 [32] 1.4676 [106] 1.46803 [8] @ 16.25° 1.4649 [23] @ 12° 1.44523 [15] $n^{61.4}_{H_\alpha}$ 1.44952 [15] $n^{53.2}_{H_\alpha}$ 1.46227 [15] $n^{24.1}_{H_\alpha}$ 1.46252 [15] $n^{23.5}_{H_\alpha}$ 1.46517 [8] $n^{16.25}_{H_\alpha}$ 1.47202 [15] $n^{23.5}_{H_\beta}$ 1.47509 [8] $n^{16.25}_{H_\beta}$ 1.47779 [15] $n^{23.5}_{H_\gamma}$ 1.48098 [8] $n^{16.25}_{H_\gamma}$ 1.48122 [15] $n^{23.5}_{H_\delta}$	$[\alpha]_D = -46.65°$ [23] $[\alpha]_D = -43.4°$ [29] $[\alpha]_D = -42.6°$ [106] $[\alpha]_D = -40.51°$ [1] $[\alpha]^{19.6}_D = -34.01°$ [8] $[\alpha]^{10}_D = -40.30°$ [91] Reference [23] has refractive indices for mercury lines.

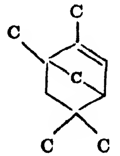
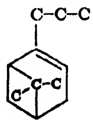
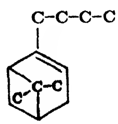
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
dl-1,7,7-Trimethyl-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1					
(dl-α-Pinene)		155 to 156 [28] @ 764mm	0.8108 [28] @ 79.6°	1.46553 [115] @ 21°	
		159 to 161 [114]	0.854 [115] @ 25°	1.4662 [79]	
		155 to 160 [14]	0.858 [115]	1.4664 [106]	
		155 to 156 [106, 115]	0.8592 [106]	1.4662 [16] @ 17.5°	
		154.5 to 155 [79] @ 754mm	0.8593 [79]	1.43707 [28] $n_{H_\alpha}^{79.6}$	
		153.5 to 154 [16] @ 750mm	0.8583 [16] @ 17.5°	1.46324 [16] $n_{H_\alpha}^{17.5}$	
			0.8635 [28] @ 16.2°	1.46736 [28] $n_{H_\alpha}^{16.2}$	
			0.8586 [37] D_{15}^{15}	1.46741 [28] $n_{H_\alpha}^{13.2}$	
			0.8638 [28] @ 13.2°	1.44639 [28] $n_{H_\beta}^{79.6}$	
				1.47317 [16] $n_{H_\beta}^{17.5}$	
				1.47631 [28] $n_{H_\beta}^{16.2}$	
				1.47741 [28] $n_{H_\beta}^{13.2}$	
				1.45192 [28] $n_{H_\gamma}^{79.6}$	
				1.48332 [28] $n_{H_\gamma}^{16.2}$	
				1.48341 [28] $n_{H_\gamma}^{13.2}$	

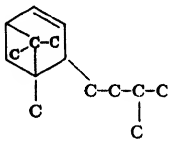
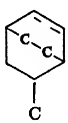
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
***d*-3,7,7-Trimethyl-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1**					$[\alpha]_D = +8.35°$ [117]
(*d*-δ-Pinene) 		156 to 159 [117] @ 748mm	0.8535 [117]	1.46434 [117]	
***l*-3,7,7-Trimethyl-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1**					$[\alpha]_D = -6.22°$ [117]
		156 to 158 [117] @ 758mm 157 [79] @ 740.5mm	0.8604 [117] 0.8708 [79]	1.46672 [117]	
***dl*-3,7,7-Trimethyl-[1,3,3]$^{(4,6)}$-bicyclo-heptene-1**					
		157 to 159 [60] @ 771mm	0.8636 [60]	1.46561 [60]	

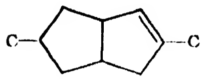
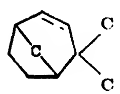
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
d-3,7,7-Trimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1 (d-Bornylene) 	109 to 109.5 [111] 109 to 110 [111]	146 [111] 146.5 [111] @ 750mm			$[\alpha]_D = +19.29°$ [111] $[\alpha]_D = +19.33°$ [111]
l-3,7,7-Trimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1 (l-Bornylene)	113 [11,13,35] 113 to 114 [12]	146 [35] @ 750mm 145.6 to 146 [12] @ 750mm 146 [11] @ 745.5mm 146 [13] @ 740mm			$[\alpha]_D = -22.27°$ [35] $[\alpha]_D = -21.69°$ [13] $[\alpha]_D = -18.45°$ [12] $[\alpha]_D^{19} = -23.94°$ [11]
dl-3,7,7-Trimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1 (Bornylene)	96 to 98 [31] 101.5 to 102.5 [80] 103 [36] 105 [18]	149 to 150 [31,36]			

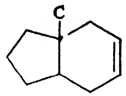
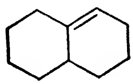
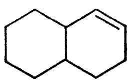
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2,3-Trimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1					
(Methyl santene)		151 to 152 [61]	0.8560 [61]	1.45943 [61]	
					
1,7,7-Trimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1					$[\alpha]_D = +2.61°$ [6]
(Isopinene)		154.5 to 155.5 [6]	0.8658 [6]	1.470253 [6]	
					
3,5,5-Trimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1					$[\alpha]_D = -68.76°$ [78] $[\alpha]_D = -57.28°$ [83]
(δ-Fenchene, Isofenchene, Fenchylene, Isofenchylene)		139 to 140 [78] @ 760mm	0.8376 [89]	1.4505 [89] @ 20.8°	$[\alpha]_D = -55.4°$ [89]
		139 to 140 [64]	0.8381 [78]	1.4486 [64]	
		138.5 to 141 [89]	0.8397 [64]	1.4494 [78]	
		140.5 to 141.5 [78] @ 740mm	0.8398 [83]	1.4502 [83]	
		140 to 141 [76,78] @ 740mm	0.842 [116]	1.4505 [78]	
		66 to 70 [116] @ 20mm	0.8433 [64]	1.47439 [116]	

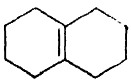
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,4,4-Trimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1					
(γ-Fenchene) 		146 to 148 [66] 145 to 150 [65] 145 to 147 [64]	0.854 [66] 0.8547 [64] @ 17° 0.855 [65] @ 17°	1.461 [66] 1.46072 [64] @ 17° 1.461 [65] @ 17°	
$C_{11}H_{18}$					
7,7-Dimethyl-1-ethyl-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1					$[\alpha]_D^0 = +33.96°$ [92]
(Methyl myrtenyl) 		95.5 to 96 [92] @ 62mm	0.8697 [92]		
1,2,3,6-Tetramethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1					
(1,4-Dimethylsantene) 		161 to 162 [62]	0.8520 [62]	1.46073 [62]	

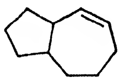
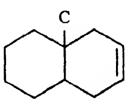
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,4,4,6-Tetramethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1 (Methyl-δ-Fenchene) 		160 to 162 [53]	0.85205 [53]	1.46261 [53] @ 20.5°	
$C_{12}H_{20}$ **7,7-Dimethyl-1-propyl-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1** (Ethyl myrtenyl) 		73 to 73.5 [92] @ 10mm	0.8663 [92]		$[\alpha]_D^0 = +21.97°$ [92]
$C_{13}H_{22}$ **7,7-Dimethyl-1-butyl-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1** (Propyl myrtenyl) 		88 to 89 [92] @ 10mm	0.8624 [92]		$[\alpha]_D^0 = +21.63°$ [92]

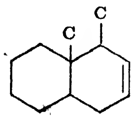
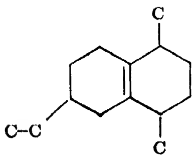
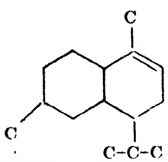
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
4,7,7-Trimethyl-3-(3-methylbutyl)-[1,1,3]$^{(4,6)}$-bicyclo-heptene-1					$[\alpha]_D = -25°$ [19] $[\alpha]_D = -4.97°$ [103]
(Dihydrocaryophyllene) 		140 [90] @ 24mm 126 [20] @ 15mm 129 to 130 [19] @ 14mm 131 [103] @ 11mm	0.8898 [19] @ 19° 0.8893 [20] @ 18° 0.8965 [103] @ 15°	1.49032 [19] 1.4885 [20] @ 18° 1.496 [103] @ 18° 1.4921 [90] @ 16°	
C_8H_{12}					
[0,*x*,*x*]-Bicycloöctene		137.5 to 139 [119]	0.891 [118] 0.9097 [119] @ 0°	1.48434 [118]	
C_9H_{14}					
4-Methyl-[2,2,2]$^{(3,6)}$-bicycloöctene-1 		147.5 to 149 [51] @ 756.7mm	0.8955 [51] @ 17°	1.4763 [51] @ 17°	

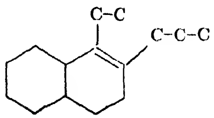
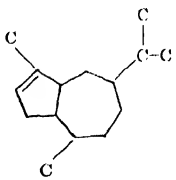
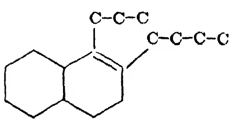
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,5-Dimethyl-[0,3,3]-bicycloöctene-1 		167 [50]	0.8605 [50] @ 24°	1.4649 [50] @ 24°	
2,6(?)-Dimethyl-[0,3,3]-bicycloöctene-2		54 to 60 [50] @ 20mm	0.8632 [50]	1.4663 [50]	
3,3-Dimethyl-[1,2,3]$^{(4,7)}$-bicyclo-öctene-1 (Endocamphene) 		170.6 to 171.6 [74] @ 744.5mm	0.8957 [74] @ 12.4°	1.48442 [74] @ 12.4°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methyl-[0,3,4]-bicyclononene-3 (8-Methylhexahydroindene) 		175 to 176 [27] @ 761mm	0.8879 [27] @ 16.5°	1.4825 [27] @ 16.5°	
[0,4,4]-Bicyclodecene-1 (Δ¹-Octalin) 		194 [25] @ 771mm 189 [25] @ 768mm 197 to 199 [48]	0.9009 [25] 0.9090 [25] 0.9103 [48] 0.9105 [46] @ 19.7°	1.48504 [25] $n_{H_\alpha}^{20}$ 1.49124 [25] $n_{H_\alpha}^{20}$ 1.49525 [25] $n_{H_\beta}^{20}$ 1.50138 [25] $n_{H_\beta}^{20}$ 1.50126 [25] $n_{H_\gamma}^{20}$ 1.50752 [25] $n_{H_\gamma}^{20}$	
[0,4,4]-Bicyclodecene-2 (*trans*-β-Octalin) 		185 [46]	0.893 [44] 0.8970 [46] @ 15.6°	1.4841 [44]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
[0,4,4]-Bicyclodecene-2					
(*cis*-β-Octalin)		76 to 78 [10] @ 15mm	0.915 [10] @ 22°	1.4959 [10] @ 22°	
		72 to 73 [10] @ 12mm	0.909 [10]	1.4902 [10]	
[0,4,4]-Bicyclodecene-2		190 to 192 [71]	0.901 [71] @ 13°	1.491 [71] @ 13°	
			0.910 [71] @ 0°		
[0,4,4]-Bicyclodecene-(1,6)					
(*trans*-Octalin) 		190 [97]	0.8723 [52] @ 25°	1.4719 [52] @ 25°	
		186 to 188 [52]	0.8936 [44] @ 19°	1.48429 [44] @ 19.5°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
[0,4,4]-Bicyclodecene-(1,6)					
	−34 [45]	190 to 191 [70] 189 [121] 194 to 196 [45] @ 749mm 88 to 89 [31] @ 19mm 88 to 89 [82] @ 14mm 79 @ 14mm [45]	0.8987 [121] @ 22.5° 0.8968 [121] @ 21° 0.8170 [45] @ 20.0° 0.9205 [81] 0.9200 [82] 0.914 [70] @ 17° 0.931 [70] @ 0°	1.4867 [121] @ 22.5° 1.4851 [121] @ 21° 1.4976 [81] 1.4979 [82] 1.4993 [70] @ 17°	
trans-[0,3,5]-Bicyclodecene-2					
		63.5 [47] @ 8mm	0.8996 [47] @ 21.0°	1.48711 [47] $n_{He}^{21.2}$	
$C_{11}H_{18}$ 1-Methyl-[0,4,4]-bicyclodecene-3					
		84 to 86 [39] @ 14mm 82 [38] @ 14mm 78 to 80 [72] @ 12mm	0.9074 [72] @ 16.2° 0.9098 [72] @ 16° 0.9085 [38] @ 15.2° 0.9053 [39] @ 15°	1.4916 [72] @ 16.2° 1.4956 [72] @ 16° 1.4943 [38] @ 15.2° 1.4939 [39] @ 15°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Methyl-[0,4,4]-bicyclodecene-x		78 to 80 [93] @ 13mm			
$C_{12}H_{20}$ **1,2-Dimethyl-[0,4,4]-bicyclodecene-3** 		98 to 103 [26] @ 12mm 95 to 99 [26] @ 10mm	0.9121 [26] @ 16.7° 0.9153 [26] @ 16.4°	14975 [26] @ 16.7° 1.4974 [26] @ 16.4°	
$C_{14}H_{24}$ **2,5-Dimethyl-8-ethyl-[0,4,4]-bicyclodecene-(1,6)** 		247 to 248 [2]			
$C_{15}H_{26}$ **2,8-Dimethyl-5-isopropyl-[0,4,4]-bicyclodecene-2** (Dihydrocadinene) 		102 to 106 [52] @ 4mm	0.8944 [52] @ 25°	1.4915 [52] @ 25°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Ethyl-3-propyl-[0,4,4]-bicyclodecene-2					
(1,2,4a,5,6,7,8,8a-Octahydro-3-*n*-propyl-4-ethylnaphthalene)		89 to 90 [84] @ 2mm	0.8913 [84]	1.4838 [84]	
					
6,10-Dimethyl-3-isopropyl-[0,3,5]-bicyclodecene-9					
(Octahydroguaiazulene)		123 to 125 [95] @ 11mm	0.8872 [95]	1.4834 [95]	
					
$C_{17}H_{30}$					
2-Propyl-3-butyl-[0,4,4]-bicyclodecene-2					
(1,2,4a,5,6,7,8,8a-Octahydro-3-*n*-butyl-4-*n*-propylnaphthalene)		109 to 110 [84] @ 2mm	0.8849 [84]	1.4830 [84]	
					

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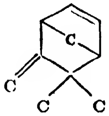
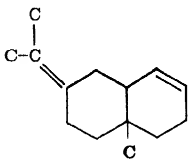
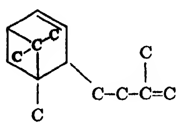
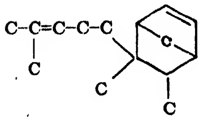
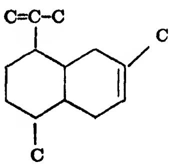
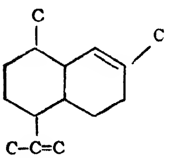
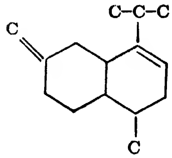
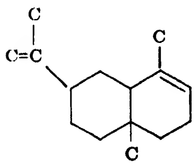
2. BICYCLENES WITH AN ALKENYL SUBSTITUTION, C_nH_{2n-6}

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
5-Methylene-4,4-dimethyl-[1,2,2]$^{(3,6)}$-bicycloheptene-1 (Isocamphodiene) 	41.5 to 42 [6]	149 to 150 [6] @ 763mm			
$C_{14}H_{22}$ 6-Methyl-9-isopropylidene-[0,4,4]-bicyclodecene-2 		125 to 126 [7] @ 12mm	0.9124 [7] @ 18°	1.5065 [7] @ 18°	
$C_{15}H_{24}$ 4,7,7-Trimethyl-3-(3-methylbuten-3-yl)-[1,1,3]$^{(4,6)}$-bicycloheptene-1 (β-Caryophyllene) 		258 to 259 [1] @ 752mm 136 to 137 [13] @ 20mm 129 to 130 [16] @ 14mm 136 to 137 [17] @ 10mm 119 to 120 [1] @ 9mm	0.9038 [1] @ 24° 0.9032 [2] 0.9030 [13] D_{20}^{20} 0.9076 [17] @ 15°	1.49976 [13] 1.50076 [2] 1.49694 [13] $n_{H_\alpha}^{20}$ 1.50830 [13] $n_{H_\beta}^{20}$ 1.51528 [13] $n_{H_\gamma}^{20}$	$[\alpha]_D^{20} = -8.959°$ [13] $[\alpha]_D^{20} = -8.95°$ [2] $[\alpha]_D^{20} = -8.5°$ to $9.5°$ [16]

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C.* @ 760mm	D_4^{20}	n_D^{20}	*Additional Data*
4,5-Dimethyl-5-(4-methylpenten-3-yl)-[1,2,2]$^{(3,6)}$-bicyclo-heptene-1					$[\alpha]_D = -41.3°$ [12]
(β-Santalene)		263 to 264 [3] 125 to 126 [12] @ 7mm	0.8940 [12] 0.9139 [3] @ 0°	1.49460 [12]	
					
3,7-Dimethyl-10-iso-propenyl-[0,4,4]-bicyclo-decene-3					$[\alpha]_D^{27} = -2.41°$ [5]
(Micranene)		266 to 268 [5] 126 to 128 [5] @ 5mm	0.9155 [5] @ 30°	1.5050 [5] @ 30°	
					
3,10-Dimethyl-7-isopropenyl-[0,4,4]-bicyclodecene-2					$[\alpha]_D^{30} = -51.36°$ [14] $[\alpha]_D = -41°$ [14]
(Isozingeberene)*		138 @ 20mm [8] 130 to 135 [9] @ 14mm 120 to 123 [14] @ 8mm 118 to 122 [14] @ 7mm	0.9070 [8] 0.9118 [14] 0.9150 [14] 0.910 [9] @ 15°	1.5030 [8] 1.506 [9] 1.5062 [14] 1.5034 [14]	*Correct structure of this seems to be 3,7-Dimethyl-5-isopropyl-[0,4,4]-bicyclo-decadiene-2,8. See Simonsen, "The Terpenes," p. 498, Cambridge Press, London, 1932.
					

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
9-Methylene-5-methyl-2-isopropyl-[0,4,4]-bicyclodecene-2					
(γ-Cadinene)		266 [4]	0.9089 [4] @ 30°	1.5021 [4] @ 30°	
					
2,6-Dimethyl-9-isopropenyl-[0,4,4]-bicyclodecene-2					$[\alpha]_D = +61.6°$ [15]
					$[\alpha]_D = +49.5°$ [11]
(α-Selinene)		268 to 272 [11]	0.9190 [15]	1.5048 [11]	$[\alpha] = +32°$ [10]
		133 to 134.5 [10]	0.9196 [11]	1.50920 [15]	
		128 to 132 [15] @ 11mm	0.9232 [11] @ 15°	1.5075 [10] @ 13°	
			0.9203 [10] @ 13°		

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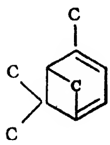
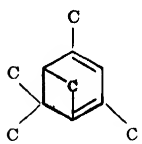
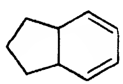
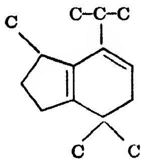
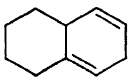
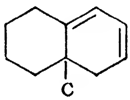
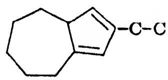
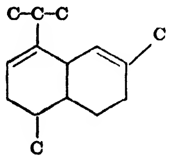
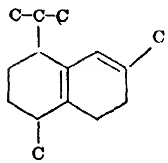
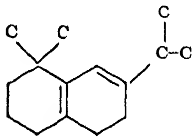
XIII. BICYCLODIENES OR BICYCLODIOLEFINS

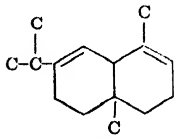
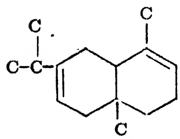
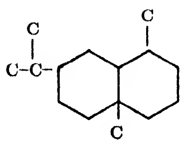
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1,5,5-Trimethyl-[1,1,3]$^{(4,6)}$-bicyclo-heptadiene-1,3					$[\alpha]_D = -71.6°$ [4] $[\alpha]_D = -100.61°$ [3]
(Verbenene) *l* 		159 to 160 [5] @ 758mm 158 to 159 [4] @ 749mm 158 to 159 [6] @ 745mm 45 @ 11mm [6]	0.8822 [5] 0.8852 [5] @ 15° 0.885 [4] @ 15° 0.8866 [6] @ 15°	1.49800 [6] 1.49855 [5]	
d		158 to 159 [6] @ 745mm	0.8867 [6] @ 15°	1.49800 [6]	$[\alpha]_D = +100.71°$ [6]
1,3,5,5-Tetramethyl-[1,1,3]$^{(4,6)}$-bicyclo-heptadiene-1,3					
(Methyl verbenene) 		175 to 176 [5] @ 771mm 49 @ 8mm [5]	0.872 [5] 0.876 [5] @ 15°	1.4969 [5]	
C_9H_{12} **[0,3,4]$^{(1,6)}$-Bicyclo-nonadiene-2,4** 		171 to 172 [37] @ 757mm	0.9274 [37] @ 16.5°	1.5153 [37] @ 16.5°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2-Isopropyl-5,5,9-trimethyl-[0,3,4]$^{(1,6)}$-bicyclononodiene-2,(6,10)					
(Guaiene) 	31.5 [2]				
$C_{10}H_{14}$					
[0,4,4]-Bicyclodecadiene-2,5 		75 to 76 [19] @ 8mm	0.9726 [19]	1.5322 [19]	
[0,4,4]-Bicyclodecadiene-x,x		199.5 to 200 [9] 197 [36] 195 [16]	0.934 [36] D_0^{23} 0.95807 [20] @ 18.4° 0.94887 [20] @ 16.4° 0.9419 [18] @ 0° 0.952 [36] D_0^0	1.52618 [20] @ 16.4° 1.52879 [20] $n_{H_\alpha}^{18.4}$ 1.52215 [20] $n_{H_\alpha}^{16.4}$ 1.54397 [20] $n_{H_\beta}^{18.4}$ 1.53648 [20] $n_{H_\beta}^{16.4}$ 1.55340 [20] $n_{H_\gamma}^{18.4}$ 1.54555 [20] $n_{H_\gamma}^{16.4}$	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
6-Methyl-[0,4,4]-bicyclodecadiene-1,3 		172 [14] @ 12mm			
$C_{12}H_{18}$ **3-Ethyl-[0,3,5]-bicyclodecadiene-2,4** 		109 to 111 [30] @ 10mm		1.5252 [30]	
1,4-Dimethyl-[0,4,4]-bicyclodecadiene-*x*,*x* (1,4-Dimethyl-hexahydronaphthalene)			0.92194 [20] @ 19.8°	1.50902 [20] @ 19.8° 1.50547 [20] $n_{H_\alpha}^{19.8}$ 1.51790 [20] $n_{H_\beta}^{19.8}$	
$C_{14}H_{22}$ **1,2,4,5-Tetramethyl-[0,4,4]-bicyclodeca-diene-*x*,*x*** (1,2,4,5-Tetramethylhexa-hydronaphthalene)		89 to 91 [33] @ 0.6mm	0.926 [33] D_{20}^{20}	1.5095 [33]	

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
d-3,7-Dimethyl-10-iso-propyl-[0,4,4]-bicyclo-decadiene-2,9 (Cadinene) 		274 to 275 [10] 273 to 275 [10] 272 to 274 [32] 260 to 261 [7] 269 [31] @ 750mm 153 to 154 [7] @ 26mm 129 to 131 [13] @ 10mm	0.9225 [31] 0.9255 [32] 0.9193 [13] @ 15° 0.9224 [10] @ 15° 0.9247 [7] @ 15°	1.5065 [32] 1.5094 [10] 1.5107 [10] 1.5108 [7] 1.5065 [13] @ 15°	$[\alpha]_D^{20} = +103.7°$ [32] $[\alpha]_D^{20} = +48.12°$ [10] $[\alpha]_D^{20} = +47.92°$ [10] $[\alpha]_D = +55°$ [31] $[\alpha]_D = +50°$ [7] $[\alpha]_{546.1}^{15} = +11.68°$ [13]
l-3,7-Dimethyl-10-iso-propyl-[0,4,4]-bicyclo-decadiene-2,9		274 to 275 [35] 272 to 275 [21,27,34] 272 [15] 271 to 272 [17] 135 to 137 [3] @ 15mm 140 to 142 [8] @ 11mm 135 [1] @ 11mm 134 to 136 [11] @ 11mm 127 to 128.5 [25] @ 6mm	0.9183 [25] @ 22° 0.918 [15] 0.9183 [17] 0.9185 [11] 0.9293 [8] @ 18° 0.9229 [27] @ 15° 0.9298 [1] @ 15° 0.9246 [3] D_{15}^{15}	1.50858 [25] @ 22° 1.50647 [35] 1.5065 [15,21] 1.50651 [27] 1.5073 [17] 1.5074 [11] 1.5070 [1] @ 15° 1.5096 [3] @ 13°	$[\alpha]_D = -130.0°$ [11] $[\alpha]_D = -116.73°$ [27] $[\alpha]_D = -110.96°$ [17] $[\alpha]_D = -105.5°$ [21] $[\alpha]_D = -98.56°$ [35] $[\alpha]_D = -79°$ [25] $[\alpha]_D = -74.6°$ [1] $[\alpha]_D = -68.38°$ [8] $[\alpha]_D = -30.82°$ [3]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3,7-Dimethyl-10-isopropyl-[0,4,4]-bicyclodecadiene-2,(1,6)					$[\alpha]_D = -1.0°$ [11]
(Isocadinene) 		124 to 128 [12] @ 12mm 124 to 126 [11] @ 11mm	0.9181 [12] 0.9154 [11]	1.5158 [11] 1.5150 [12]	
10,10-Dimethyl-3-isopropyl-[0,4,4]-bicyclodecadiene-2,(1,6)					
(Bicycloisoprenemyrcene) 		130 to 134 [22] @ 13mm	0.9136 [22] @ 21°	1.5051 [22] @ 21°	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,6-Dimethyl-9-iso-propyl-[0,4,4]-bicyclo-decadiene-2,9 or -2,8 (δ- or ε-Selinene)  δ-form or  ε-form		130 [29] @ 12mm	0.9234 [29] @ 14°	1.5167 [29] @ 14°	$[\alpha]_D = +194.3°$ [29]
Eudesmene (Position of double bonds unknown) 		132 to 136 [24] @ 15mm 128 to 132 [23] @ 12mm 129 to 132 [28] @ 10mm 122 to 124 [26] @ 7mm 121 to 123 [28] @ 6mm	0.9232 [28] 0.9214 [23] 0.9204 [28] 0.91964 [26] 0.9175 [24]	1.50987 [24] 1.50874 [26] 1.50738 [28] 1.5125 [23] 1.5134 [24] @ 19°	$[\alpha]_D = +54.1°$ [26] $[\alpha]_D = +52.6°$ [24] $[\alpha]_D^{20} = +51°$ [28] $[\alpha]_D^{20} = +49°$ [28]

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(2) K. Birrell, J. Am. Chem. Soc. **57**, 893, **1935**.
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(5) A. Blumann and O. Zeitschel, Ber. **46**, 1178, **1913**.
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(7) E. Deussen, Arch. Pharm. **240**, 288, **1902**.
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(17) N. Lepeschkin, J. Russ. Phys. Chem. Soc. **40**, 698, **1908**.
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(22) L. Ruzicka and W. Bosch, Helv. Chim. Acta **14**, 1336, **1931**.
(23) L. Ruzicka and E. Capato, Ann. **453**, 62, **1927**.
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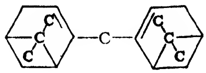
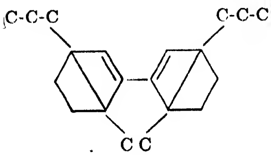
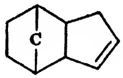
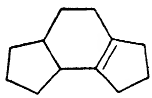
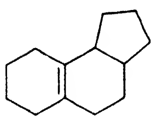
(34) S. Uchida, J. Am. Chem. Soc. **38**, 687, **1916**.
(35) O. Wallach and E. Conrady, Ann. **252**, 141, **1889**.
(36) F. Wreden, J. Russ. Phys. Chem. Soc. **9**, 183, **1877**; Ber. **9**, 1598, **1876**.
(37) N. D. Zelinsky and P. Borissov, Ber. **57**, 2060, **1924**.

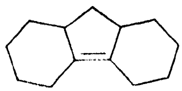
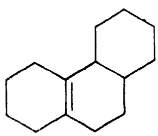
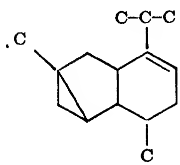
XIV. DIBICYCLENES OR DIBICYCLOÖLEFINS; C_nH_{2n-10}

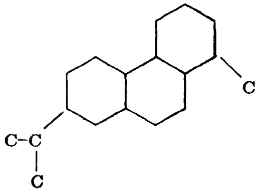
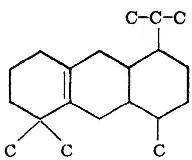
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Di-(7,7-dimethyl-[1,1,3]$^{(4,6)}$-bicyclohepten-1-yl)-methane (Dimyrtenyl) 		173 to 174 [2] @ 10mm	0.9521 [2]		$[\alpha]_D^0 = +13.793°$ [2]
$C_{20}H_{30}$ **Pinaconene** 	55 to 56 [1]		0.93046 [1] @ 61°	1.50233 [1] @ 61°	

(1) E. Beckmann, Ann. **292**, 1, 1896.
(2) H. Rupe and A. Heritier, Ann. **459**, 171, 1927.

XV. POLYCYCLENES, C_nH_{2n-6}

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Dihydrodicyclopentadiene 	47 [17] 50 to 51 [2]	178 [3] @ 766mm 67 to 68 [17] @ 14mm 78 to 80 [15] @ 13mm			
$C_{12}H_{18}$ **6,7-Cyclopentano-[0,3,4]-bicyclononene-(1,5)** (1,2,3,3a,4,5,6,7,8,8b-Decahydro-*as*-indacene) 		107 to 108 [6] @ 17mm	0.9397 [6]	1.4990 [6]	
$C_{13}H_{20}$ **2,3-Cyclopentano-[0,4,4]-bicyclodecene-(1,6)** (1,2,3,4,5,6,7,8-Octahydro-1,2-cyclopentanonaphthalene) 		74 to 76 [8] @ 3mm	0.9513 [8]	1.5074 [8]	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Decahydrofluorene 		258 to 259 [11] @ 745mm 258 [13] @ 737mm 254 [4] @ 727mm	1.012 [13]	1.5060 [13]	
$C_{14}H_{22}$ **Δ[11]-Dodecahydrophenanthrene** 		268 to 269 [12] @ 737mm 81 to 82 [8] @ 1.5mm	0.964 [12] 0.9674 [8]	1.5098 [7] 1.5102 [8] 1.5119 [12]	
$C_{15}H_{24}$ **Copaene** 		246 to 251 [10] 119 to 120 [14] @ 10mm	0.9077 [10] @ 15°	1.48943 [10]	$[\alpha]_D = -13.21°$ [10]

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Dodecahydroretene (Double bond position not indicated) 		336 [5] 148 to 150 [1,16] @ 10mm	0.8985 [1,16]	1.48510 [1,16]	
$C_{20}H_{34}$ **7,7-Dimethyl-3,4-(5-methyl-2-isopropyl-cyclohexano)-[0,4,4]-bicyclodecene-(1,6)** (1,2,3,4,4′,5,6,7,8,9,9′,10-Dodecahydro-1-isopropyl-4,5,5-trimethylanthracene, Tricyclic camphorene dihydride) 		176 [9] @ 12mm	0.9410 [9] @ 14°	1.5118 [9] @ 14°	

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(2) K. Alder and G. Stein, Ann. **485,** 223, **1931.**
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(11) J. Schmidt and E. Fischer, Ber. **41,** 4227, **1908.**
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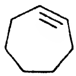
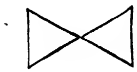
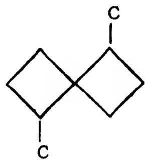
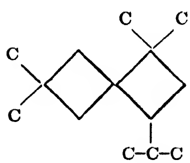
(17) H. Wieland and F. Bergel, Ann. **446,** 13, **1925.**

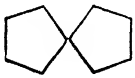
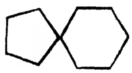
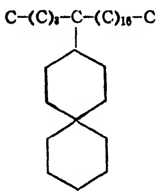
XVI. CYCLYNES OR CYCLOACETYLENES, C_nH_{2n-4}

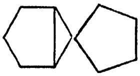
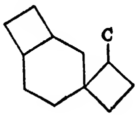
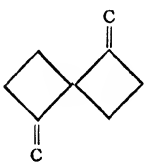
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cycloheptyne-1 (Suberoterpene) 		120 to 121 [1]			
$C_{15}H_{26}$ **Cyclopentadecyne**		158 to 159 [1,2] @ 14mm	0.8843 [1,2] @ 21°	1.4910 [1,2] @ 21°	
$C_{17}H_{30}$ **Cycloheptadecyne**		127 to 128 [2] @ 0.25mm	0.8840 [2] @ 22°	1.4869 [2] @ 22°	

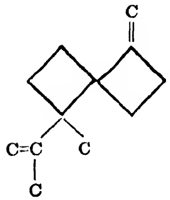
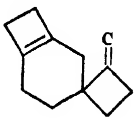
(1) W. Markownikow, J. Russ. Phys. Chem. Soc. **34,** 911, 1902.
(2) L. Ruzicka, M. Hurbin, and H. A. Boekenoogen, Helv. Chim. Acta **16,** 498, **1933.**

XVII. SPIRO-HYDROCARBONS

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-2}					
Cyclopropane-spiro-cyclopropane 		39.5 to 40.5 [6] @ 746mm	0.7266 [6]	1.4120 [6]	
C_9H_{16}					
1,5-Dimethyl-cyclobutane-spiro-cyclobutane 		132 [4] @ 756mm	0.7972 [4] @ 20.0°	1.43459 [4] @ 20.0°	
$C_{14}H_{26}$					
1,1,6,6-Tetramethyl-3-isopropyl-cyclobutane-spiro-cyclobutane 		116 to 118 [4] @ 23mm	0.8380 [4] @ 20.0°	1.46362 [4] @ 19.9°	

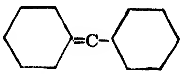
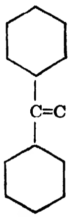
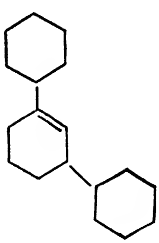
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
Cyclopentane-spiro-cyclopentane 		60 @ 12mm [2]			
$C_{10}H_{18}$ Cyclopentane-spiro-cyclohexane 		185 to 186 [8] @ 745mm 75 @ 20mm [3]	0.8877 [8]	1.4748 [8]	
$C_{33}H_{64}$ 5-(Cyclohexane-spiro-cyclohexyl)-docosane 			0.867 [5] @ 25°	1.4793 [5] @ 25°	

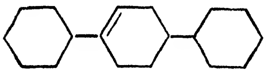
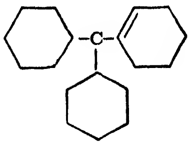
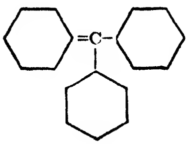
Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-4}					
[0,1,3] (6,10)-Bicyclo-hexane-spiro-cyclo-pentane					
		189 to 190 [7] @ 764.5mm	0.9134 [7] @ 17°		
$C_{12}H_{20}$ 1-Methyl-[0,2,4] (7,10)-bicycloöctane-spiro-cyclobutane					
		77 to 78 [4] @ 13.5mm	0.8679 [4] @ 20.0°	1.46809 [4] @ 20.0°	
C_nH_{2n-6}					
C_9H_{12} 1,5-Dimethylene-cyclo-butane-spiro-cyclo-butane					
		135 [4] @ 774mm 70.5[4] @ 90mm 38 [4] @ 21mm	0.8264 [4] @ 20.0°	1.48064 [4] @ 20.0°	

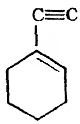
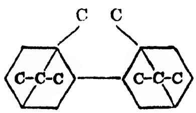
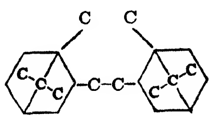
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
1-Methylene-5-methyl-5-isopropenyl-cyclobutane-spiro-cyclobutane					
		101 [4] @ 10mm	0.9346 [4] @ 20.0°	1.52624 [4] @ 20.0°	
C_nH_{2n-8}					
$C_{12}H_{16}$					
1-Methylene-[0,2,4]$^{(7,10)}$-bicyclo-öctene-7,10-spiro-cyclobutane					
		72 to 74 [4] @ 9mm	0.8955[4] @ 20.0°	1.50301 [4] @ 20.0°	

(1) N. N. Chatterjee, J. Indian Chem. Soc. **13**, 536, **1936**.
(2) N. N. Chatterjee, J. Indian Chem. Soc. **14**, 259, **1937**.
(3) G. R. Clemo and J. Ormston, J. Chem. Soc. **1933**, 352.
(4) S. V. Lebedev and B. K. Mereshkowsky, J. Russ. Phys. Chem. Soc. **45**, 1249, **1913**.
(5) L. Mikeska, Ind. Eng. Chem. **28**, 970, **1936**.
(6) N. D. Zelinsky and W. Krawetz, Ber. **46**, 163, **1913**.
(7) N. D. Zelinsky and N. I. Schuikin, J. Russ. Phys. Chem. Soc. **62**, 1343, **1930**.
(8) N. D. Zelinsky and N. I. Schuikin, J. Russ. Phys. Chem. Soc. **62**, 2180, **1929**.

XVIII. HYDROCARBONS OF KNOWN BUT UNCLASSIFIED STRUCTURE

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-4} **Cyclohexylcyclo-hexylidenemethane** 		133 [12] @ 20mm 111 to 112 [5] @ 12mm	0.8972 [5] 0.919 [12] @ 0°	1.4908 [5]	
$C_{14}H_{24}$ **1,1-Dicyclohexylethene** 		140 @ 18mm [14]			
C_nH_{2n-6} **$C_{18}H_{30}$** **1,3-Dicyclohexylcyclo-hexene-1** 		204 to 207 [13] @ 15mm			

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
1,4-Dicyclohexylcyclohexene-1					
(Hexadecahydroterphenyl)	111 to 113 [2]	190 [2] @ 13mm			
					
$C_{19}H_{32}$					
Dicyclohexylcyclohexen-1-ylmethane					
	41 [10]				
Dicyclohexylcyclohexylidenemethane					
		175 [10] @ 10mm			

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
1-Ethynylcyclohexene-1					
		148 to 151 [1] 145 to 146 [9] 40 to 43 [2] @ 12mm	0.8800 [9]	1.4922 [1] 1.4978 [9]	
$C_{20}H_{34}$ **2,7,7-Trimethyl-1-(2,7,7-trimethyl-[1,2,2]$^{(3,6)}$-bicycloheptyl)-[1,2,2]$^{(3,6)}$-bicyclo-heptane**					$[\alpha]_D = +28.47°$ [6] $[\alpha]_D = +15.56°$ [4]
(Bis-[2,7,7-trimethyl-[1,2,2]-bicyclo]-heptyl) 	94 [8] 85 to 87 [6] 75 [4] 74 to 75 [7]	326 to 327 [4] 322 to 323 [7] 321 to 323.6 [8] 188 to 190 [7] @ 12mm	1.001 [4] @ 15° (solid)		
C_nH_{2n-6}					
$C_{22}H_{38}$ **1,2-Dicamphane ethane**					
		205 to 208 [11] @ 11mm			

(1) Bayer and Co., Ger. Pat. 290,558.
(2) J. v. Braun, G. Irmisch, and J. Nelles, Ber. **66**, 1471, 1933.
(3) W. Carothers and D. Coffman, J. Am. Chem. Soc. **54**, 4071, 1932.
(4) A. Étard and G. Meker, Compt. rend. **126**, 526, 1898.
(5) F. G. Fischer and O. Stoffers, Ann. **500**, 253, 1932.
(6) A. Hesse, Ber. **39**, 1127, 1906.
(7) J. Houben, Ber. **38**, 3796, 1905.
(8) E. Letts, Ber. **13**, 793, 1880.
(9) R. Levina and S. Levina, J. Gen. Chem. (U.S.S.R.) **8**, 1776, 1938.
(10) O. Neunhoeffer, Ann. **509**, 115, 1934.
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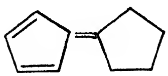
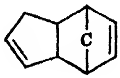
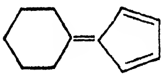
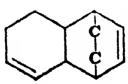
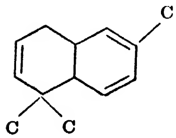
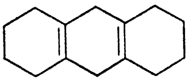
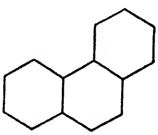
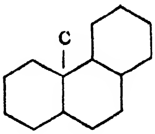
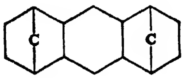
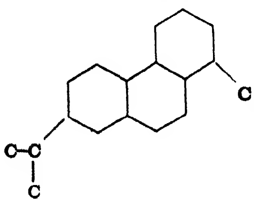
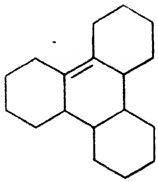
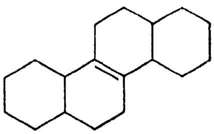
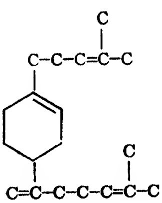
(12) P. Sabatier and A. Mailhe, Compt. rend. **139**, 343, 1904.
(13) W. Schrauth, W. Wege, and F. Danner, Ber. **56**, 260, 1923.
(14) E. Venus-Danilova, J. Russ. Phys. Chem. Soc. **61**, 1479, 1929.

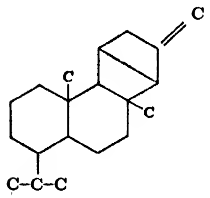
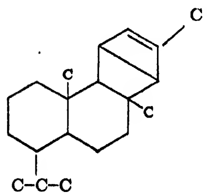
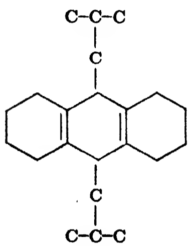
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-8} Cycloöctatetraene 	−27 [43] approx.	42.2 to 42.4 [44] @ 17mm 36.2 to 36.4 [44] @ 14mm	0.925 [44] 0.923 [43] 0.920 [43] 0.943 [44] @ 0°	1.53944 [43] 1.54225 [43] 1.5389 [44] 1.53413 [43] $n_{H_\alpha}^{20}$ 1.53659 [43] $n_{H_\alpha}^{20}$ 1.55377 [43] $n_{H_\beta}^{20}$ 1.55759 [43] $n_{H_\beta}^{20}$ 1.57089 [43] $n_{H_\gamma}^{20}$ 1.57426 [43] $n_{H_\gamma}^{20}$	
$C_{10}H_{12}$ Cyclopentylidene-cyclopentadiene 		55 to 57 [16] @ 2mm			

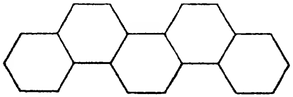
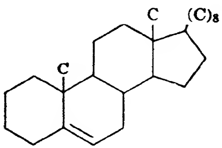
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
2,5-Endomethylene-bicyclo-[0,4,3]-nonodiene-3,7					
(Dicyclopentadiene) 	32.9 [28] 32.5 [41] 32 [1,32,33,36]	163 [1] @ 766mm 170 [17,32] 169.5 to 170 [4] 95 @ 55mm [17] 88 @ 35mm [17] 70 @ 24mm [36] 69 @ 12mm [33] 68 to 70 [34] @ 12mm	0.9302 [6] @ 77.25° 0.9756 [17] @ 35° 0.9766 [17] @ 33° 1.012 [28] @ 17.5° (solid)	1.48031 [6] $n_{H_\alpha}^{77.25}$ 1.51047 [36] $n_{H_\alpha}^{20}$ 1.49121 [6] $n_{H_\beta}^{77.25}$ 1.52181 [36] $n_{H_\beta}^{20}$ 1.49766 [6] $n_{H_\gamma}^{77.25}$	
C_nH_{2n-8}					
$C_{11}H_{14}$					
Cyclohexylidene-cyclopentadiene 		78 to 80 [16] @ 25mm			
$C_{12}H_{16}$					
[1,4]-Endoethylene-[0,4,4]-bicyclodecadiene-3,7 		229 to 230 [2,10]	0.9944 [2]	1.5265 [2]	

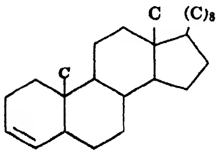
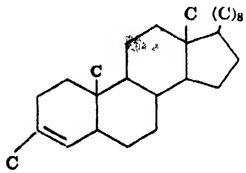
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
3,7,7-Trimethyl-[0,4,4]$^{(1,6)}$-bicyclo-decatriene-2,4,8 (Irene) 		127 [15] @ 17mm; 113 to 115 [15,37] @ 9mm	0.9402 [37]	1.5274 [37]	
$C_{14}H_{20}$ **3,4-Cyclohexano-[0,4,4]-bicyclodeca-diene-3,(1,6)** 	73 to 74 [13]				
Decahydrophen-anthrene 	− 18 to − 20 [29]	274 to 275 [29] @ 737mm	0.993 [29]	1.5335 [29]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-8} **Methyldecahydrophenanthrene** 		76.5 [11] @ 1mm			
$C_{16}H_{24}$ **1,4,5,8-Di-(endo-methylene)-tetradecahydroanthracene** 		157 to 159 [5] @ 16mm			
$C_{18}H_{28}$ **Decahydroretene** 		336 to 340 [25] 155 to 158 [39] @ 10mm	0.975 [25] 0.9342 [39]	1.51501 [39]	

Name and Carbon Skeleton	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Hexadecahydro-triphenylene 		186 to 188.5 [28] @ 12mm	0.9518 [28]		
Hexadecahydro-chrysene 		360 [20] 168 [3] @ 0.5mm 154 [3] @ 0.3mm	1.0129 [3]	1.5442 [3] @ 17°	
C_nH_{2n-8}					
$C_{20}H_{32}$					
α-Camphorene 		190 to 192 [27] @ 12mm 178 to 180 [30] @ 8.5mm 177 to 178 [31] @ 6mm 178 [14] @ 4.5mm	0.8864 [14] @ 21° 0.8870 [31] 0.8844 [30]	1.4998 [14] 1.50339 [31] 1.50199 [30]	

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-8}					
Sciadopitene					$[\alpha]_D^{20} = +11.05°$ [24]
	95 to 96 [24]				
Isosciadopitene					$[\alpha]_D^{20} = +22.13°$ [24]
	106 to 107 [24] 110 to 111 [38]				
$C_{22}H_{36}$					
9,10-Diisobutyldecahydroanthracene					
	86 to 87 [22,23]	145 [22] @ 0.01mm			

	Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
	C_nH_{2n-8}					
	Piceneperhydride					
		175 [21]	over 360 [21]			
$C_{23}H_{38}$	**Dehydronorcholane**	66 to 67 [42]				
	C_nH_{2n-8}					
$C_{27}H_{46}$	**Cholestene**					$[\alpha]_D = -53.05°$ [9]
		90 to 91 [9]				

Name and Carbon Skeleton	M. P.,°C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Pseudocholestene 	77 to 78 [35] 78 to 79 [9,19]				$[\alpha]_D = +60.13°$ [9] $[\alpha]_D^{29} = +66.9°$ [35]
C_nH_{2n-8} **$C_{28}H_{48}$** **3-Methyl-Δ^3(?)-cholestene** 	81 to 82 [7]				

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(26) H. Roscoe, Ann. **232**, 348, **1886**.
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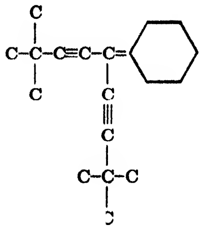
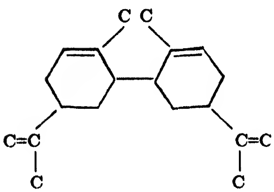
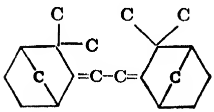
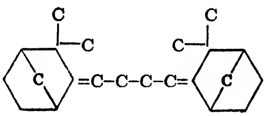
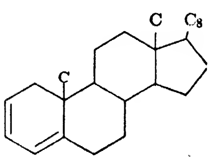
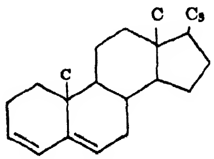
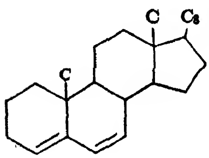
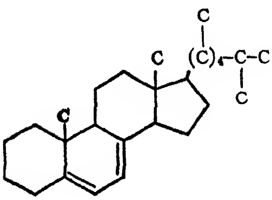
Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-10} **Di-[*tert*-butyl ethynyl]-cyclohexylidene methane** 		105 to 110 [5] @ 3mm	0.8578 [5] D_{20}^{20}	1.4838 [5]	
$C_{20}H_{30}$ **2-Methyl-5-iso-propenyl-1-(2-methyl-5-isopropenylcyclo-hexen-2-yl)-cyclo-hexene-2** (Biscarvene*) 		169 to 171 [6] @ 11mm			*Structure taken from Beilstein.

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
1,2-Di-(2,2-dimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptylidene)-ethane (Dicamphenylidene ethane) 	181 [7]				
C_nH_{2n-10}					
$C_{22}H_{34}$ **1,4-Di-(2,2-dimethyl-[1,2,2]$^{(3,6)}$-bicyclo-heptylidene)-butane** (1,4-Dicamphenylidene butane) 		210 [7] @ 25mm	0.952 [7] @ 15°		$[\alpha]_D = +67.30°$ [7]
$C_{27}H_{44}$ **Cholestadiene-2,4** 	79 [8] 63 [10] 61 [2]				$[\alpha]_D^{23} = -112.5°$ [8] $[\alpha]_D^{27} = +114.0°$ [10] $[\alpha]_D^{18} = +114.0°$ [2]

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
Cholestadiene-3,5 	76 [1] 75.9 to 80 [4] 78 to 79 [9]				$[\alpha]_D^{25} = -103.24°$ [4] $[\alpha]_D = -100°$ [1] $[\alpha]_D^{21} = -63.75°$ [9]
C_nH_{2n-10} **Cholestadiene-4,6** 	84 to 85 [4]				$[\alpha]_D^{28} = +45.77°$ [4]
7-Dehydrocholestene 	88 to 89 [3]				

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(2) A. Butenandt and H. Kudsuss, Z. physiol. Chem. **253**, I-III, 1938.
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(4) J. C. Eck, R. L. van Peursem, and E. W. Hollingsworth, J. Am. Chem. Soc. **61**, 171, 1939.
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(6) C. Harries and F. Kaiser, Ber. **32**, 1320, 1899.
(7) G. Langlois, Ann. chim. [9] **12**, 265, 1919.
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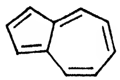
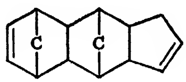
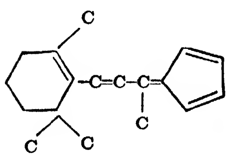
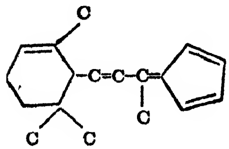
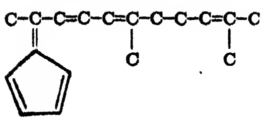
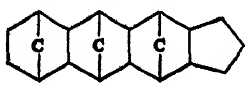
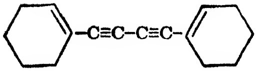
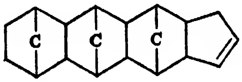
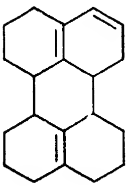
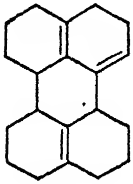
Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-12}					
[0,3,5]-Bicyclodeca-pentaene					
	98.5 to 99 [6]				
$C_{15}H_{18}$					
Tricyclopentadiene					
	60 [7,8,9] 66 [2] 68 [1]	254 [1] @ 766mm 110 [7] @ 3mm 105 [8] @ 3mm 90 to 92 [9] @ 0.06mm			
C_nH_{2n-12}					
$C_{18}H_{24}$					
3-Cyclopentadien-2,4-ylidene-1-(2,6,6-trimethylcyclohexen-1-yl)-butene-1					
(6-(β-[2′,6′,6′-Trimethylcyclohexen-1-yl]-vinyl)-6-methylfulvene)		111 to 113 [4] @ 0.5mm			
					

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
3-Cyclopentadien-2,4-ylidene-1-(2,6,6-trimethylcyclohexen-2-yl)-butene-1					
(6-(β-[2′,6′,6′-Trimethylcyclohexen-2-yl]-vinyl)-6-methylfulvene)		107 to 109 [4] @ 5mm			
					
C_nH_{2n-12}					
6,10-Dimethyl-2-cyclopentadien-2,4-ylidene-undecatriene-3,5,9					
(6-[4′,8′-Dimethylnonatrienyl-1′,3′,7′]-6-methylfulvene)		139 to 141 [4] @ 0.5mm			
					
$C_{20}H_{28}$					
Tetrahydrotetracyclopentadiene					
	200 to 202 [9]				

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-14} **Dicyclohexen-1-yl-butadiyne** 	62.5 to 63 [5]				
$C_{20}H_{26}$ **Dihydrotetracyclopentadiene** 	205 [3]	361 [3] @ 766mm			
α-Tetradecahydroperylene-Δ-1,2,9,10,9′,10′ 	180 to 181.5 [11]				

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
β-Tetradecahydro-perylene-Δ-3,4,9,10,9′,10′ 	161 to 162 [11]				

(1) K. Alder and G. Stein, Ann. **485**, 223, 1931.
(2) K. Alder and G. Stein, Ann. **496**, 204, 1932.
(3) K. Alder and G. Stein, Ber. **67**, 613, 1934.
(4) E. Kohler and J. Kable, J. Am. Chem. Soc. **56**, 2756, 1934.
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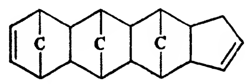
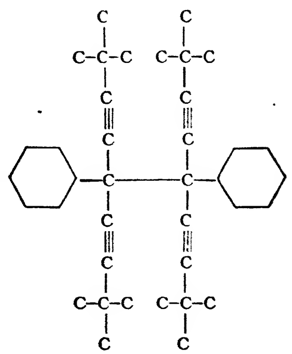
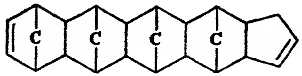
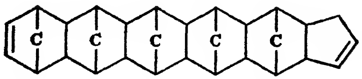
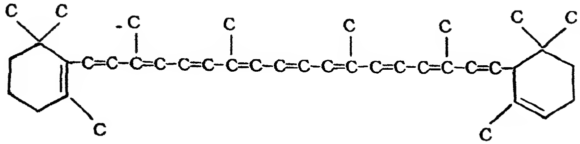
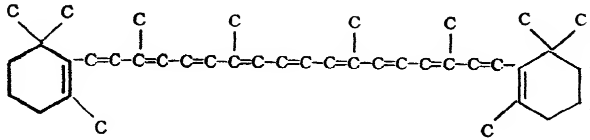
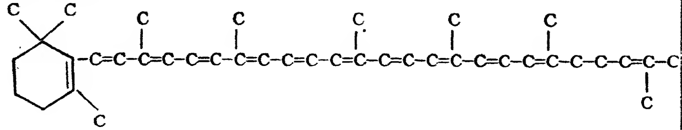
(8) H. Staudinger and H. A. Bruson, Ann. **447**, 97, 1926.
(9) H. Staudinger and A. Rheiner, Helv. Chim. Acta **7**, 23, 1924.
(10) J. Thiele and H. Balhorn, Ann. **348**, 1, 1906.
(11) S. Uchida and S. Takata, J. Soc. Chem. Ind. Japan, Suppl. Binding **36**, 222, 1933.

Name and Carbon Skeleton	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-16}					
Tetracyclopentadiene 	188 to 190 [11] 190 [9]	344 [1] @ 766mm 160 [9] @ 1mm 160 to 165 [10] @ 1mm			
C_nH_{2n-18}					
$C_{38}H_{58}$ sym-Dicyclohexyl-tetra-*tert*.-butylethynyl)-ethane 	149 to 150 [3]				

	Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
	C_nH_{2n-20}					
	Pentacyclopentadiene 	270 [9,10]				
	C_nH_{2n-24}					
$C_{30}H_{36}$	**Hexacyclopentadiene** 	373 [9]				

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-24}					
α-Carotene					$[\alpha]_D^{15} = -63°$ [9]
	174 to 175 [6] 174.5 to 175.5 [7] 182.3 to 182.7 [8] 183 [4] 187 to 188 [5] 183.5 [2] uncor.				
β-Carotene					
	180.5 [8] 182 [2] 178 to 180 [7] 187 [4]				

Name and Carbon Skeleton	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
γ-Carotene 	178 [4]				

(1) K. Alder and G. Stein, Ber. 67, 613, 1934.
(2) A. E. Gillam and M. S. El Ridi, Biochem. J. 30, 1735, 1936.
(3) H. Gillespie and C. S. Marvel, J. Am. Chem. Soc. 52, 3368, 1930.
(4) P. Karrer, "Lehrbuch der Organischen Chemie," Leipzig, 1937, p. 723.
(5) P. Karrer and O. Walker, Helv. Chim. Acta 16, 641, 1933.
(6) R. Kuhn and H. Brockmann, Z. physiol. Chem. 200, 255, 1931.
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(8) J. H. C. Smith and H. W. Milner, J. Biol. Chem. 104, 437, 1934.
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(10) H. Staudinger and H. A. Bruson, Ann. 447, 97, 1926.
(11) H. Staudinger and A. Rheiner, Helv. Chim. Acta 7, 23, 1924.

XIX. HYDROCARBONS OF UNDETERMINED STRUCTURE

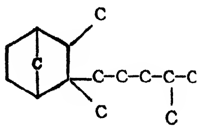
(Thought to belong to the naphthene or cyclic series)

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n}					
Hexahydrogeijerene		96 @ 20mm [1]	0.8373 [1] D_{25}^{25}	1.4577 [1] @ 25°	
$C_{15}H_{30}$ Hexahydroelemene		114 to 116 [4] @ 10mm	0.8450 [4]	1.4621 [4]	$[\alpha]_D = -4.8°$ [4]
Hexahydro-α-curcumene		128 @ 7mm [2]	0.8283 [2] D_{30}^{30}	1.4952 [2] @ 30°	
Hexahydro-β-curcumene		128 @ 7mm [2]	0.8283 [2] D_{30}^{30}	1.4552 [2] @ 30°	$[\alpha]_D^{30} = +6.3°$ [2]
***d*-Tetrahydroferulen**		118 to 122 [3] @ 10mm	0.8400 [3]	1.45810 [3]	$[\alpha]_D^{20} = +4.2°$ [3]

(1) A. R. Penfold and J. L. Simonsen, J. Proc. Roy. Soc. N. S. Wales, **66**, 332, 1932.
(2) B. S. Rao and J. L. Simonsen, J. Chem. Soc. **1928**, 2496.
(3) F. W. Semmler, K. G. Jonas, and P. Roenisch, Ber. **50**, 1823, 1917.
(4) F. W. Semmler and F. Liao, Ber. **49**, 794, 1916.

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-2}					
Dihydrobicycloekasantalane					
		204 [6] @ 768mm; 75 to 77 [6] @ 10mm	0.8705 [6] @ 15°	1.47151 [6] @ 15°	
Tetrahydrogeijerene					
		95 @ 20mm [1]	0.85058 [1] D_{25}^{25}	1.4695 [1] @ 25°	
$C_{15}H_{28}$ **Decahydrochamazulene**					
		119 to 120 [2] @ 12mm	0.8808 [2] @ 15mm	1.4776 [2] @ 15mm	
Decahydro-S-guaiazulene					
		130 to 131 [2] @ 13mm; 132 to 134 [2] @ 12mm	0.8798 [2] @ 15°; 0.8823 [2] @ 15°	1.4783 [2] @ 15°; 1.4790 [2] @ 15°	

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-2}					$[\alpha]_D^{12} = +36.99°$ [14]
Tetrahydroatractylene		129 to 130 [14] @ 10mm	0.9030 [14] @ 11°	1.49589 [14] @ 12°	
Tetrahydrobetulene		118 to 120 [8] @ 11mm	0.8737 [8] @ 18°	1.4744 [8] @ 18°	$[\alpha]_D = -3°$ [8]
Tetrahydrocaryophyllene		122 to 123 [10] @ 12mm	0.8712 [10]	1.4700 [10]	$[\alpha]_D = +3°$ [10]
Tetrahydroelemene		118 to 120 [9] @ 12mm 117 to 119 [9] @ 10mm	0.8576 [9] 0.8659 [9]	1.4760 [9]	$[\alpha]_D = -15.2°$ [9] $[\alpha]_D = -20.4°$ [9]
Tetrahydroguaiene		118 to 119 [12] @ 7mm 126 to 128 [3] @ 12mm	0.8806 [12] 0.8884 [3] @ 15°	1.47840 [12] 1.4811 [3] @ 15°	$[\alpha]_D = +10.52°$ [12]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-2} **Tetrahydro-α-santalane** * 		115 to 116 [12] @ 9mm	0.8655 [12]	1.46908 [12]	[α] = +5.6° [12] *Suggested by Simonsen, "The Terpenes," Vol. II, p. 548.
Tetrahydrosantalene		116 to 118 [7] @ 9mm	0.864 [7]	1.4676 [7]	$[\alpha]_D$ = +7.5° [7]
Tetrahydroselinene		128 to 130 [4] @ 12mm 126 to 128 [11] @ 10.5mm 125 to 126 [11] @ 10mm	0.8881 [11] 0.8889 [12] 0.8903 [4] 0.8910 [4] 0.8970 [4]	1.4823 [4] 1.48259 [11] 1.4830 [4] 1.48375 [11] 1.4877 [4]	[α] = +1.12° [11]
A fully hydrogenated sesquiterpene		265 [13]	0.8994 [13] @ 22°		$[\alpha]^{21}$ = +5.62° [13]

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-2}					
Tetrahydrozingiberene					
		130 to 135 [5] @ 18mm	0.842 [5] @ 15°	1.463 [5] @ 15°	

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Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-4}					
Carveprene		183 to 186 [9]			
Chamene		168 to 170 [11] 86 to 88 [11] @ 50mm	0.8228 [11] @ 25°	1.4686 [11] @ 25°	$[\alpha]_D = +35°$ [11]
Citronellal-terpene			0.8535 [8]	1.4875 [8]	
Dacrydene		165 to 166 [27]	0.8524 [27] D_{15}^{22}		$[\alpha]_D = +14.48°$ [27]
Isochamene		88 to 90 [11] @ 50mm	0.8222 [11] @ 25°	1.4726 [11] @ 25°	$[\alpha]_D^{25} = -0.27$ [11]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-4}					
Norbicycloekasantalane					$[\alpha]_D = -19°$ [18]
		186 to 189 [18]	0.8827 [18]	1.4779 [18]	
		62 to 64 [18] @ 9mm			
$C_{11}H_{18}$					
Bicycloekasantalane					
		183.5 [18] @ 767mm	0.871 [18]	1.46856 [18]	
		72 to 74 [18] @ 10mm	0.885 [18]	1.4774 [18]	
		57 to 59 [18] @ 9mm			
$C_{15}H_{26}$					
Dihydroaromadendrene					
		121 to 122 [3] @ 10mm	0.9014 [3] @ 17°	1.4871 [3] @ 17°	

Hydrocarbons of Undetermined Structure	M.P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-4}					
Dihydrocopaene		118 to 121 [24] @ 12mm	0.8926 [24] @ 18°	1.47987 [24] temp.not given	$[\alpha] = -12.2°$ [24]
Dihydrocyperene		113 to 116 [12] @ 12mm	0.9332 [12] D_{19}^{19}		$[\alpha]_D^{19} = +7.6°$ [12]
Dihydroguaiene		124 to 125 [15] @ 15mm 122 @ 11mm [7] 102.2 [30] @ 1mm	0.8914 [7] @ 25° 0.8955 [15] 0.9089 [7] @ 0°	1.4836 [30] @ 23° 1.49817 [7] @ 20.2° 1.4894 [15]	$[\alpha]_D^{18.5} = -26.65°$ [7]
Dihydro-α-gurjunene		129 [29] @ 14mm	0.9090 [29] 0.8977 [29]	1.49061 [29] 1.4897 [29]	$[\alpha]_D = -18°$ [29]

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-4}					
Dihydro-β-gurjunene					$[\alpha]_D = -42°$ [29]
		120 @ 8mm [19]	0.9239 [23]	1.49490 [23]	$[\alpha]_D = -37.5°$ [19]
		115 to 117 [23] @ 7mm	0.9172 [29]	1.4922 [29]	$[\alpha]_D = -37°$ [23]
Dihydroledene					
		112 to 115 [13] @ 6mm	0.9075 [13]	1.492324 [13]	
Dihydro-α-santalene					
			0.899 [19]	1.495 [19]	
Dihydroselinene					
		138 to 139 [16] @ 12mm	0.8992 [16] @ 24°	1.4878 [16]	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-4}					
Dihydrosesqui-citronellene					
		131 to 133 [22] @ 12mm	0.8316 [22]	1.4800 [22]	
Dihydrovetivene					$[\alpha]_D = -1.8°$ [21]
		126 to 132 [21]	0.90734 [21]	1.48685 [21]	
Elemane					
		115 to 119 [10] @ 10mm	0.8830 [10] @ 17°	1.4950 [10] @ 17°	
Ferulene					$[\alpha]_D^{20} = +6°$ [20]
		126 to 128 [20] @ 10mm	0.8687 [20]	1.48377 [20]	
			0.8698 [20]	1.48423 [20]	
		124 to 126 [20] @ 7mm			
Isodihydro-caryophyllene					$[\alpha]_D = -29.4°$ [5]
		137 to 138 [17] @ 19mm	0.8872 [5] @ 21°	1.4880 [5] @ 21°	
		124 to 124.5 [5] @ 12.75mm	0.919 [17]	1.4925 [17]	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-4}					
Octahydroazulene					
		123 to 124.5 [14] @ 10mm	0.8935 [25] @ 25° 0.8967 [14] @ 15°	1.490 [25] 1.4921 [14] @ 15°	
Tetrahydrokessylene					
		105 to 108 [1] @ 5mm	0.8931 [1] @ 18°	1.47289 [1] @ 18°	
$C_{16}H_{28}$					
α-Kayene					$[\alpha]_D^{20} = -7.9°$ [31]
		33.5 to 34.5 [31] @ 8mm	0.8600 [31]	1.4713 [31]	
β-Kayene					$[\alpha]_D^{20} = -15.1°$ [31]
		44.5 to 45.5 [31] @ 8mm	0.8591 [31]	1.4721 [31]	
$C_{18}H_{30}$					
Dihydroabietene					
			0.933 [8]	1.522 [8]	

Hydrocarbons of Undetermined Structure	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-4}					
Tetrahydroditerpene					
	26 [4]				
Tetrahydromanoene					
		141 to 142 [9] @ 0.2mm	0.9158 [9]	1.5030 [9]	
Totarene					
	74.5 to 75 [26]				
$C_{40}H_{76}$					
Eicosahydrocarotene					$[\alpha]_D^{20} = +0.337°$ [28]
		206 [28] @ 0.0001mm	0.8748 [28] @ 24.2°	1.4821 [28] @ 24.2°	

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Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6} **Cycloöctatriene**					
		147.2 to 148.2 [122] 133 to 135 [121] @ 715mm 57 to 57.5 [121] @ 49 to 50mm 36 to 40 [121] @ 13mm 31.2 to 31.8 [122] @ 8mm	0.9086 [122] 0.903 [120] 0.912 [121] @ 0° 0.925 [122] @ 0°	1.52844 [120]	
$C_{10}H_{14}$ **p-Menthatriene**					
		183 [113]	0.863 [113]	1.49693 [113]	
$C_{11}H_{16}$ **Methylmenthatriene**					$[\alpha]_D = +90.32°$ [68]
		90 to 91.5 [1] @ 21mm 89.2 to 89.4 [1] @ 18mm 74 to 75 [69] @ 10mm 74 to 76 [68] @ 9.5mm	0.8728 [68] 0.8745 [68] 0.8747 [68] 0.8748 [68] 0.8738 [1] @ 19.0° 0.8686 [1] @ 18.8° 0.8776 [50] @ 15°	1.5007 [69] 1.50152 [68] 1.50124 [1] @ 19.0° 1.49875 [1] @ 18.8°	$[\alpha]_D^{21} = +69.12°$ [50]

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
Geijerene					
		85 @ 17mm [59]	0.8720 [59] D_{20}^{20}	1.4888 [59]	
1,4-Diisopropenyl-cyclohexene-1 or 1-Isopropenyl-4-iso-propylidene-cyclo-hexene-1					
Low boiling		95 to 98 [4] @ 20mm	0.8715 [4]	1.48717 [4] $n_{H_\alpha}^{20}$ 1.50902 [4] $n_{H_\gamma}^{20}$	
High boiling		105 to 108 [4] @ 20mm	0.8706 [4]	1.48650 [4] $n_{H_\alpha}^{20}$	
$C_{15}H_{24}$					
Aromadendrene					$[\alpha]_{577}^{20} = -6.1°$ [9]
		121 to 121.4 [9] @ 10mm 121 @ 10mm [9]	0.9116 [9] 0.9157 [9] @ 17°	1.4978 [9] 1.4993 [9] @ 17°	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-4}					
Atractylene					$[\alpha]_D^{13} = +78.35°$ [106]
		260 to 263 [27] 125 to 126 [27] @ 10mm 108 to 109 [106] @ 3mm	0.9101 [27] D_{15}^{20} 0.9154 [27] D_{15}^{15} 0.9189 [105] @ 13°	1.50893 [27] 1.51795 [106] @ 13°	
Azulene terpene					$[\alpha]_D = +11.40°$ [78]
	30 to 31 [3]	167 to 168.4 [51] @ 11mm 127 to 128 [79] @ 10mm 120 to 122 [79] @ 10mm 140 to 145 [58] @ 5mm 117 to 120 [78] @ 5mm 135.6 [51] @ 1.1mm	0.98771 [51] @ 25° 0.98465 [51] D_{25}^{25} 0.9835 [58] @ 15° 0.9134 [78] D_{15}^{15}	1.5021 [78]	
Betulene					$[\alpha]_D^{21} = +6°$ [91]
		123 to 127 [91] @ 13mm 130 to 132 [109] @ 20mm	0.9120 [91] @ 21° 0.9213 [109]	1.4952 [91] @ 21° 1.5144 [109]	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Bulnesene					
		113.5 to 115 [119] @ 6mm	0.9149 [119]	1.50467 [119]	
Calamene					$[\alpha]_D = +5°$ [97]
		127 to 130 [74] @ 14mm 123 to 126 [97] @ 10.5mm	0.9224 [97] D_{19}^{20} 0.9231 [74] D_{15}^{15}	1.50572 [97] 1.5023 [74] @ 19°	
Camarene					$[\alpha]_D^{27} = +6.74°$ [42]
		263 [42] 121 to 122 [42] @ 4mm	0.9056 [42] @ 30°	1.500 [42] @ 30°	
Carlinene					
		139 to 141 [86] @ 20mm	0.8733 [86] @ 23.8°	1.492 [86] @ 23.8°	

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
α-Caryophyllene					$[\alpha] = -4.97°$ [19]
					$[\alpha] = -24.07°$ [16]
		130 to 131 [62] @ 24mm	0.8923 [62] D_{25}^{25}	1.4942 [62] @ 25°	$[\alpha]_D^{19} = -26.174°$ [17]
		139 to 140 [15] @ 19mm	0 8953 [16]	1.49617 [17]	$[\alpha]_D^{19} = -21.85°$ [15]
		125 to 125.5 [17] @ 14.5mm	0.8959 [16]	1.49665 [17] @ 19°	$[\alpha]_{5461} = -29.7°$ [90]
		123 to 124 [17] @ 14.5mm	0.8986 [19]	1.496 [19] @ 18°	
		122 to 124 [16] @ 12mm	0.8990 [17]	1.496 [19] @ 16°	
		131 @ 10mm [19]	0.89951 [17] D_0^{19}		
			0.8965 [19] @ 15mm		

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
Cedrene					$[\alpha]_D = -85.5°$ [82]
		264 to 268 [117,118]	0.9325 [93]	1.49798 [82]	$[\alpha]_D = -85°$ [96]
		264 [82]	0.93258 [13]	1.49817 [82]	$[\alpha]_D = -82°$ [107]
		263.5 to 264 [82]	0.9338 [98]	1.5015 [13]	$[\alpha]_D = -67°$ [107]
		261 to 262 [12,14]	0.9342 [96]	1.50251 [13]	$[\alpha]_D = -60.8°$ [103]
		237 [84]	0.9345 [96]	1.5028 [82]	$[\alpha]_D = -60°$ [12,93,107]
		262 to 263 [103] @ 750mm	0.9359 [12,14]	1.50233 [89] @ 15°	$[\alpha]_D = -59°$ [93]
		129 to 132 [107] @ 17mm	0.9362 [107]	1.4991 [12] $n_{H_\alpha}^{20}$	$[\alpha]_D = -56.51°$ [13]
		124 to 126 [89] @ 12mm	0.9365 [107]	1.4964 [29] $n_{H_\alpha}^{18}$	$[\alpha]_D = -56.2°$ [94]
		123 to 124 [94] @ 12mm	0.9385 [103]	1.5011 [30] $n_{H_\alpha}^{13}$	$[\alpha]_D = -55°$ [89]
		118 to 119 [96] @ 12mm	0.9231 [82] @ 18°	1.5133 [30] $n_{H_\beta}^{13}$	$[\alpha]_D = -47.8°$ [67]
		131 to 132 [67] @ 10mm	0.9354 [89] @ 15°	1.5258 [30] $n_{H_\gamma}^{13}$	$[\alpha]_D = -47.54°$ [84]
		119 [93] @ 10mm	0.9366 [82] @ 15°		
		116 to 117 [96] @ 10mm	0.9367 [82] @ 15°		
		114 to 115 [96] @ 9mm			
		112 to 113 [96] @ 7mm			
		119 to 121 [93] @ 3mm			

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Clovene					
Fraction I		251 to 253 [72] @ 765mm 117 to 119 [72] @ 16mm	0.9215 [72] @ 18°	1.4968 [72] @ 18°	$[\alpha]_D = -29.66°$ [72]
Fraction II		260 to 262 [72] @ 765mm 122 to 124 [72] @ 16mm	0.9244 [72] @ 18°	1.4951 [72] @ 18°	$[\alpha]_D = -39.66°$ [72]
		261 to 263 [114] 131 to 139 [17] @ 15.5mm 111 to 113 [36] @ 10mm	0.924 [36] 0.92223 [17] D_0^{19} 0.930 [114] @ 18°	1.4980 [36] 1.4740 [17] @ 19° 1.50066 [114] @ 18°	$[\alpha]_D = +1.3°$ [36] $[\alpha] = +1.3°$ [17]
α-Costene					$[\alpha]_D = -12°$ [88]
		122 to 126 [88] @ 12mm	0.9014 [88] @ 21°	1.49807 [88] @ 16°	
β-Costene					$[\alpha]_D = +6°$ [88]
		144 to 149 [88] @ 18mm	0.8728 [88] @ 22°	1.4905 [88]	
Cubebene					$[\alpha]_D = -39.15°$ [84]
		255 to 260 [14] 220 [84]	0.915 [84] @ 15°		

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
α-Curcumene					$[\alpha]_D^{30} = -22.9°$ [63]
		128 to 130 [63] @ 9mm	0.8633 [63] D_{30}^{30}	1.4944 [63] @ 30°	
β-Curcumene					$[\alpha]_D^{30} = -27.9°$ [63]
		128 to 130 [63] @ 6mm	0.8810 [63] D_{30}^{30}	1.4940 [63] @ 30°	
Curcumene					$[\alpha]_D^{30} = +16.35°$ [45]
		139 to 142 [45] @ 13mm 140 to 142 [84] @ 12mm	0.9235 [45] @ 24°	1.50594 [45] @ 24°	
Cyclolinaloolene					
		165 to 167 [85]	0.8112 [85]	1.4602 [85]	
Cyclosesquicitronellene					
		129 to 132 [98] @ 15mm	0.8892 [98]	1.5069 [98]	

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
Cyperene					$[\alpha]_D^{13} = +1.5°$ [49]
		110 to 115 [49] @ 7mm	0.9372 [49] D_{13}^{13}	1.50127 [49] @ 13°	
α-Cyperene					
		132 to 133 [7] @ 15mm			
Dicyclic sesquiterpene					$[\alpha]_D^{30} = -11.9°$ [63]
		115 to 117 [63] @ 7mm	0.8932 [63] D_{30}^{30}	1.4936 [63] @ 30°	
Dysoxylonene					
		136 to 137 [58] @ 10mm	0.9236 [58] @ 15°	1.5063 [58]	
Elemene					
		115 to 117 [92] @ 10mm	0.8797 [92]		

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Equinopanocene		135 to 138 [46] @ 15mm	0.9051 [46] @ 5°	1.5013 [46] @ 15°	$[\alpha]_D^5 = +33.5°$ [46]
Fokienene		112 to 114 [31] @ 7mm	0.8802 [31] @ 15°	1.49594 [31] @ 13°	$[\alpha]_D^{16} = +16.93°$ [31]
Galipene		255 to 260 [14]	0.912 [14] @ 19°		
Gonystylene		137 to 139 [23] @ 17mm	0.9183 [23] @ 17°	1.5134 [23] @ 15°	$[\alpha]_D^{17} = +40°$ [23]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Guaiene					$[\alpha]_D = -16.8°$ [75]
		135 to 138 [35] @ 14mm	0.8954 [28] @ 25°	1.49468 [28] @ 25°	$[\alpha]_D^{20} = -40.35°$ [27]
		134 to 136 [3] @ 22mm	0.9085 [27]	1.5022 [75]	$[\alpha]_D^{25} = -66.11°$ [28]
			0.9182 [35]	1.50114 [116]	
		128 to 130 [75] @ 12mm	0.910 [116]	1.50049 [27]	
			0.9115 [75] @ 19°		
		124 [28] @ 11mm	0.9133 [28] @ 0°		
		123 to 124 [27] @ 9mm			
		124 to 128 [116] @ 13mm			
α-Gurjunene					$[\alpha] = -95°$ [90]
		114 to 116 [90] @ 10mm	0.919 [108]	1.5010 [90]	$[\alpha]_D = -90°$ [72]
			0.918 [90]	1.501 [108]	
		122 to 126 [75] @ 12mm	0.9285 [75] @ 15°	1.5047 [75] @ 15°	
		119 [18] @ 12mm			
iso-α-Gurjunene					$[\alpha]_D = -135°$ [108]
			0.9109 [108]	1.5101 [108]	

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
β-Gurjunene					$[\alpha]_D = +74.5°$ [90]
		120 to 123 [90] @ 13mm	0.9348 [90]	1.50526 [99]	$[\alpha]_D = +70.5°$ [108]
		122.5 to 123.5 [18] @ 12mm	0.9329 [99]	1.50275 [90]	
		113.5 to 114 [99] @ 7mm	0.9321 [108]	1.5022 [108]	
iso-β-Gurjunene					$[\alpha]_D = -36°$ [108]
			0.9313 [108]	1.5109 [108]	
Hexahydro-chamazulene					
		118 to 124 [76] @ 11mm	0.9117 [76]	1.5200 [76]	
Humulene					$[\alpha]_D^{20} = -0.5°$ [11]
		263 to 266 [11]	0.8977 [11] D_{20}^{20}	1.5021 [11] @ 19°	
		132 to 137 [25] @ 13mm	0.9001 [11] D_{15}^{15}	1.4978 [11] $n_{H_\alpha}^{19}$	

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
Isocamerene					$[\alpha]_D^{27} = -11.21°$ [42]
		253 [42] 110 to 111 [28] @ 5mm	0.8942 [42] @ 30°	1.4925 [42] @ 30°	
Isoclovene					$[\alpha]_D^{14} = -56.6°$ [36]
		130 to 131 [36] @ 12mm	0.943 [36] @ 19°	1.5039 [36] @ 19°	
Isocostene					$[\alpha]_D = +31°$ [88]
		130 to 135 [88] @ 12mm	0.9062 [88] @ 21°	1.50246 [88]	
Isofokienene					$[\alpha]_D^{21} = +5.92°$ [32]
Fraction I		95 to 96 [32] @ 3mm	0.9075 [31,32]	1.5041 [32] @ 21°	
α-Isosantalene					$[\alpha]_D = +6.1°$ [33]
		225 to 256 [33]			

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
β-Isosantalene		259 to 260 [33]			$[\alpha]_D^{24} = +16.89°$ [33]
Isosesquichamene		265 to 268 [111] 129 to 131 [43,44,111] @ 12mm	0.9320 [44,111] @ 21.5° 0.9367 [111]	1.5109 [44,111] @ 21.5° 1.5009 [111]	$[\alpha]_D^{21.5} = -8.52°$ [111] $[\alpha] = -15.7°$ [111] $[\alpha]_D^{21.5} = -8.532°$ [44]
Machilene		142 to 144 [73] @ 20mm	0.9267 [73] @ 15°	1.5104 [73] @ 15°	$[\alpha]_D = +63°$ [73]
Patchoulene		255 to 256 [81] 254 to 256 [116] 252 to 255 [52] @ 743mm 112 to 115 [27] @ 12 to 12.5mm	0.939 [116] @ 23° 0.9296 [27] 0.9334 [81] @ 15° 0.937 [52] @ 13.5° 0.946 [52] @ 0°	1.49835 [27] 1.50094 [116]	$[\alpha]_D^{20} = -38.08°$ [27] $[\alpha]_D = -42.10°$ [51] $[\alpha]_D = -36.52°$ [81]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Populene					$[\alpha]_D = +21.22°$ [54]
		121 to 122 [54] @ 8mm	0.9135 [54] @ 15°	1.504 [54] @ 15°	
γ-Santalene					
		118 to 120 [87] @ 9 to 10mm	0.9355 [87]	1.5042 [87]	
Sesquibenhene					$[\alpha]_D^{24} = +35.7°$ [41]
		127 to 131 [41] @ 10°	0.9162 [41] @ 14°	1.5058 [41] @ 24°	
Sesquichamene					$[\alpha]_D^{28} = -89.85°$ [43,44]
		112.5 to 123.5 [43,44] @ 12mm	0.9277 [43,44] @ 28°	1.5021 [43,44] @ 28°	
Sesquicitronellin					$[\alpha]_D = +0.36°$ [98]
		138 to 140 [98] @ 9mm	0.8489 [98]	1.53252 [98]	

Hydrocarbons of Undetermined Structure	*M. P.,°C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Sesquiterpene-1		140 [13a] @ 26mm	0.902 [13a] @ 15°		
Sesquiterpene-2		153 to 154 [13a] @ 26mm	0.9247 [13a] @ 15°		$[\alpha]_D = +50°$ [13a]
Sesquiterpene from aliharz oil		270.8 to 271 [83] @ 754mm	0.9190 [83] @ 15°	1.52252 [83] @ 15°	$[\alpha]_D = +131.99°$ [83]
Sesquiterpene from balsoharz balsam		118 to 119 [2] @ 8mm	0.9104 [2] @ 30°	1.4956 [2] @ 30°	$[\alpha]_D^{30} = +116.4°$ [2]
Sesquiterpene from caryophyllene-dihydro-chloride			0.9191 [102]	1.49901 [102]	$[\alpha] = -35.39°$ [102]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Sesquiterpene from citronellol		272 to 275 [80] 170 to 172 [80] @ 16mm 157 [80] @ 15mm	0.8643 [80] @ 15°		
Sesquiterpene from Ethereal Oil of Pittosporum		263 to 264 [61] 167 to 171 [61] @ 60mm	0.9100 [61] D_{15}^{15}	1.5030 [61]	
Sesquiterpene from alcohol from Capaiba balsam		252 [112] @ 759mm	0.952 [112] @ 15°	1.5189 [112] @ 15°	$[\alpha]_D = -61.7°$ [112]

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
Sesquiterpene from Matico Oil					$[\alpha]_D = -10.83°$ [106]
		138 to 139 [106] @ 17mm 133 to 134 [106] @ 11mm	0.914 [106] 0.916 [106]	1.50542 [106] 1.50808 [106] $n_{H_\alpha}^{21}$ 1.52177 [106] $n_{H_\beta}^{21}$ 1.53028 [106] $n_{H_\gamma}^{21}$	
Sesquiterpene from Ysop Oil					
		125 [75] @ 12mm	0.9116 [75] @ 17°	1.5012 [75] @ 17°	
Sesquiterpene from Cubebene Oil					
		274 to 275 [115]	0.918 [115]	1.50467 [115]	
Sesquiterpene from Eucalyptus Globulus Oil					
		124 to 127 [75] @ 12mm	0.9078 [75]	1.4969 [75]	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Sesquiterpene from Eucalyptus Globus Oil		127 to 131 [75] @ 12mm	0.9172 [75]	1.5001 [75]	
Sesquiterpene		266 [26]	0.9269 [26] @ 30°	1.5094 [26] @ 30°	
Sesquiterpene		265.5 to 266 [101] @ 750mm	0.9326 [101] @ 15°	1.50602 [101]	$[\alpha]_D = +58.40°$ [101]
Sesquiterpene		247 to 248 [101] @ 748mm	0.8956 [101] @ 15°	1.49287 [101]	$[\alpha]_D = -55.48°$ [101]
Sesquiterpene from Cymbopogon Sennaarensis, Chiov Oil		150 to 155 [66] @ 27mm	0.9114 [66] D_{15}^{15}		$[\alpha]_D^{23} = +24.40°$ [66]
Sesquiterpene		127 [53] @ 14mm	0.8961 [53] @ 30°	1.4990 [53] @ 30°	$[\alpha]_D^{30} = +16.1°$ [53]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Sesquiterpene					
		122 to 127 [39] @ 10mm		1.527 [39] @ 17°	
Terebenthene					$[\alpha]_D = +3.2°$ [65]
		155.4 to 155.8 [10] @ 748.9mm	0.8685 [22] @ 25° 0.867 [65] @ 17°	1.4648 [22] @ 15°	$[\alpha]_D = -40.3°$ [22]
Vetivene					$[\alpha]_D = -10.20°$ [95]
Bicyclic		137 to 140 [95] @ 16mm 132 to 133 [71] @ 12mm	0.9321 [95] 0.9339 [71] @ 15°	1.51896 [95] 1.5179 [71]	
Vetivene					
Tricyclic		123 to 130 [95] @ 16mm 126 to 127 [71] @ 12mm	0.9335 [95] 0.9372 [71] @ 15°	1.51126 [95] 1.5143 [71] @ 15°	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-6}					
Dihydrocyclosclarene					$[\alpha]_D = +33.4°$ [40]
		122 to 128 [40] @ 0.15mm	0.9288 [40] @ 25° 0.9296 [40] @ 24°	1.5075 [40] @ 25°	
Dihydroisomanoene					
		123 to 124 [38] @ 0.2mm	0.9164 [38] @ 19°	1.5048 [38] @ 19°	
α-Dihydromanoene					
		149 to 150 [38] @ 0.3mm	0.9206 [38] @ 21°	1.5089 [38] @ 21°	
α-Dihydropodocarprene					$[\alpha[_D^{20} = -15.85°$ [56]
	83 to 84 [56]				
β-Dihydropodocarprene					$[\alpha]_D = +7.80°$ [56]
		203 to 204 [56] @ 17mm		1.5121 [56]	
α-Dihydrophyllocladene					$[\alpha]_D^{22} = +23.25°$ [8]
	73 to 74 [8]				
β-Dihydrophyllocladene					
	55 [8]				

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
Kaurene					
	86 to 87 [37]		0.9282 [37] @ 106° 0.9330 [37] @ 100°	1.4912 [37] @ 100°	
$C_{27}H_{48}$					
Allo-α-ergostane					$[\alpha]_D = +17.0°$ [64]
	84 to 85 [64]				
Bombisestane					$[\alpha]_D^{18} = +18.6°$ [48]
	79 [48] 81 [47]				
Cholestane					$[\alpha]_D = +24.59°$ [110]
	79 [110] 71 [104] 70 to 71 [6]				

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
Lupane	184 to 185 [20]				
Soja-γ-sitostane	87 [5]				$[\alpha]_D^{15°} = +20.2°$ [5]
$C_{28}H_{50}$					
Pseudoergostane	64 [24]				$[\alpha]_D^{19} = +25.3°$ [24]
Ergostane	81 to 82 [24]; 82 [21]				$[\alpha]_D^{18} = +22.9°$ [24]
$C_{30}H_{54}$					
Artostane	101 [55]				

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-6}					
Stigmastane					
	84 to 84.5 [123]				

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Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Calamenene					
		136 to 140 [44] @ 12mm	0.942 [44] @ 16°	1.5239 [44] @ 16°	
Dehydrobetulene					$[\alpha]_D^{23} = -68°$ [57]
		112 to 114 [57] @ 9mm	0.9186 [57] @ 23°	1.5052 [57] @ 23°	
$C_{18}H_{28}$					
Dinormenthadiene					
		170 to 172 [36] @ 16mm			
$C_{19}H_{30}$					
Abietine also "Diterebentyl"					
		253 to 255 [16] @ 82 to 85mm 210 to 211 [35] @ 26.5mm 199 to 200 [16] @ 13mm	0.977 [35]		

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
l-Bifenchene					$[\alpha]_D = -5.15°$ [56]
		321 to 325 [56] @ 751mm	0.9488 [56] @ 15°	1.50762 [56]	
γ-Camphorene					
		176 to 178 [28a] @ 4.5mm	0.8875 [28a] @ 19°	1.5030 [28a] @ 19°	
Colophen					
		318 to 320 [13]			
α-Cryptomerene					$[\alpha]_D = +34.22°$ [50]
	61 [50]	345 [50] 198 [50] @ 15mm			
β-Cryptomerene					
	212 [50] with sublimation				

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Dacrene	96 [1,7]			1.5120 [7] @ 13°	Briggs states that Dacrene, Sciadopitene, and Phyllocladene are identical and that the use of the names Dacrene and Sciadopitene should be discontinued in the literature.
Dicarvenene		170 to 173 [46] @ 10mm	0.928 [46]	1.5175 [46]	
Dicinene		329 to 334 [32] 328 to 333 [23] 182 [32] @ 13mm			
Diisocarvestrine		188 to 190 [19] @ 20mm			

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Diisochamene					$[\alpha]_D^{20} = -0.7°$ [38]
		155 to 156 [28] @ 4mm	0.9150 [28]	1.5134 [28]	
Dipinene					
		183 to 184 [11] @ 15mm	0.9260 [11]	1.5174 [11]	
Diterpene					$[\alpha]_{5461}^{25} = -1.11°$ [24]
	57 to 58 [24] 55.5 [38]	320 [38] 184 to 186 [24] @ 10mm 140 to 142 [24] @ 1mm	0.9631 [24] @ 60° 0.9686 [24]	1.5132 [24] @ 60° 1.5150 [24] @ 56° 1.5208 [24] @ 25° 1.5244 [24]	
Diterpene					$[\alpha]_D = +214°$ [52]
		178 [52] @ 8mm			
Diterpene					
		156 to 160 [42] @ 13mm	0.8966 [42] D_{20}^{20}	1.5048 [42]	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Diterpene from 1-Pinene and Limonene in the presence of HCl					
		330 to 332 [33] 174 to 178 [33] @ 11mm	0.932 [33] @ 17.5°	1.51983 [33]	
Diterpene					
		180 to 185 [20] @ 15mm	0.9309 [20] D_{30}^{30}	1.5168 [20] @ 30°	
Diterpene					
		142 to 143 [2] @ 4mm	0.8654 [2] D_0^{23}	1.5080 [2] @ 23°	
Diterpenes from *l*-α-Phellandrene					$[\alpha]_D^{20} = +14.96°$ [12]
		182 to 184 [12] @ 16mm	0.9257 [12]	1.5171 [12]	
oil from Eucalyptus dives					$[\alpha]_D^{20} = +13.20°$ [12]
		193 to 195 [12] @ 24mm	0.9245 [12]	1.5178 [12]	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
oil from Eucalyptus phellandra					$[\alpha]_D^{20} = +3.28°$ [12]
		194 to 196 [12] @ 24mm	0.9272 [12]	1.5173 [12]	
oil from Melaleuca acuminata					$[\alpha]_D^{20} = +1.00°$ [12]
		191 to 193 [12] @ 22mm	0.9303 [12]	1.51813 [12]	
Diterpene					
		173 to 183 [41] @ 13mm	0.9361 [41]	1.5170 [41]	
Diterpene with 3 double bonds					
		170 [17] @ 12mm	0.923 [17]	1.5143 [17]	
Diterpene-bicyclic with 3 double bonds					$[\alpha]_D = +1.64°$ [40]
		178 to 180 [40] @ 6mm	0.8892 [40]	1.4884 [40]	

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-8}					
Diterpilene					
		210 to 212 [34] @ 4mm	0.9404 [34] @ 0°		
Isodacrene					$[\alpha]_D = +48.4°$ [1]
	107 [4] 107 [1]				
Isophyllocladene					$[\alpha]_D^{17} = +23.4°$ [9]
	110.5 to 112 [9] 108 to 109 [10]				
Methylabietine					
		135 to 138 [45] @ 0.15mm	0.9734 [45] @ 24°	1.5313 [45] @ 24°	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Phyllocladene	95 [48] 98 [9]				$[\alpha]_D^{25} = +15.8°$ [9] $[\alpha]_D = +16.06°$ [48]
Pinaconane	98 [5]				
α-Podocarprene	50 [38]				$[\alpha]_D^{20} = -111.71°$ [38]
β-Podocarprene		188 to 190 [38]	0.9688 [38] @ 15°	1.5203 [38]	$[\alpha]_D^{20} = -15.88°$ [38]
δ-Podocarprene	65 [29]				$[\alpha]_D^{11} = -27.1°$ [29]
Sclarene		125 to 128 [43] @ 0.2mm	0.9388 [43] @ 17°	1.5217 [43] @ 17°	$[\alpha]_D = -14°$ [43]

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-8} Tetracyclic Diterpene					$[\alpha]_D^{25} = -25.1°$ [27]
		185 to 186 [27] @ 12mm	0.9648 [27] @ 25°	1.5185 [27] @ 25°	
Tricyclic Diterpene					
		179 to 182 [3] @ 12mm	0.9482 [3]		
$C_{21}H_{34}$					
		135 [26] @ 0.2mm	0.9212 [26] @ 16°	1.5114 [26] @ 16°	
$C_{22}H_{36}$					
	79 [53]				
$C_{23}H_{38}$ Dehydrocholane					
		213 to 218 [53] @ 12mm; 210 to 213 [53] @ 12mm			

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Amyranene					
	182 to 183 [14]				
Bombicestene					
	91 to 92 [30]				
Inagostene					$[\alpha]_D^{20} = -50.7°$ [31]
	89 [31]				
Lupene					
	180 to 181 [14]				
Microcionastene					
	61 to 62 [6]				

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Neocholestene	71 to 74 [22]				
Pseudositostene	69 [8]				
Soja-γ-sitostene	73 [8] 76 to 77 [55]				$[\alpha]_D = -59.3°$ [8]
α-Ergostene	77 to 78 [22a]				$[\alpha]_D^{22} = +11°$ [22a]
β-Ergostene	87 to 88 [22b] 86 to 87 [15] 78 [15]				$[\alpha]_D = +21.3°$ [22b]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-8}					
Δ^{24}-Pseudoergostene					$[\alpha]_D^{17} = +20.3°$ [18]
	103 [18]				
$C_{30}H_{52}$					
Cryptostene					$[\alpha]_D^{19} = +60.1°$ [54]
	74.5 to 76 [54]				

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Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-10}					
α-Cholesterylene					$[\alpha]_D = -116.20°$ [19]
	79 to 80 [13,19]	257 to 267 [20] @ 12mm	0.9572 [20]	1.52027 [20]	$[\alpha]_D = -109.30°$ [22]
	79 [20,21]				$[\alpha]_D = -107°$ [23]
	78.2 [12]				$[\alpha]_D = -102.1°$ [10]
	78 [3,10]				
	77 [22,23]				$[\alpha]_D = -61.55°$ [21]
	75.5 [2]				$[\alpha]_D = -47.7°$ [20]
	74 to 76 [11]				$[\alpha]_D^{18} = -17.53°$ [12]
β-Cholesterylene					
	59 [3]				
α-Ergostadiene					$[\alpha]_D^{22} = -10°$ [9]
	124 to 125 [9]				
β-Ergostadiene					$[\alpha]_D^{22} = -33°$ [9]
	66 to 67 [9]				
Dehydroergostene					$[\alpha]_D^{23} = -15°$ [14]
	71 to 72 [14]				

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-10}					
Amyrene		120 [4] @ 15mm			$[\alpha]_D^{20} = +44.9°$ [4]
α-Amyrene I	96 to 97.5 [24]				$[\alpha]_D^{19} = +72.2°$ [24]
β-Amyrene	98 [18]	252 [18] @ 12mm			
β-Amyrene Ib	104 [24]				$[\alpha]_D = +98.9°$ [24]
β-Amyrene I	89 to 91.5 [24]				$[\alpha]_D = +77.6°$ [24]
β-Amyrene Ia	209 to 210 [24]				$[\alpha]_D^{19} = +115°$ [24]
α-Amyrene II	120 to 122 [24]				
β-Amyrene II	162 [24]				$[\alpha]_D^{19} = +94.6°$ [24]
β-Amyrene III	187 to 189.5 [24]				$[\alpha]_D^{19} = -22°$ [24]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-10}					
Amyrene (*Continued*)					
β-Amyrene IV	159 to 161 [24]				$[\alpha]_D^{18} = +57.3°$ [24]
Dihydro-α-amyrilene	84 to 85 [16]		0.841 [16] (solid)		$[\alpha]_D = +120.2°$ [16]
Dihydro-β-amyrilene					
I	83 to 85 [16]		0.846 [16] (solid)		$[\alpha]_D = +131.5°$ [16]
II	92 to 93 [17]		0.941 [17] @ 102°		$[\alpha]_D = +77°$ [17]
Friedelene	257 to 258 [5]				
Isolanostene	80 to 81 [6]				

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-10}					
Lanostene	76 to 77 [6]				
Oleanene	193 [25]				$[\alpha]_D^{23} = +56.5°$ [25]
Oleanene I	113 to 116 [24]				
Oleanene II	193 [24]				
Oleanene III	225 to 226 [24]				$[\alpha]_D^{20} = +30.1°$ [24]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-10}					
Iso-tetracyclosqualene		228 to 230 [8] @ 3mm	0.9237 [8] D_{20}^{20}	1.5098 [8]	
α-Viscane	98 [1]				
β-Viscane	136 [1]				
$C_{31}H_{52}$					
Methyl friedelene	272 to 274 [5]				
$C_{48}H_{86}$					
Thevetene	79 to 80 [7]				

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Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-12}					
Chamazulene					
		159 [17] @ 11mm	0.9881 [17] @ 18°		
Elemazulene					
			0.9355 [14] @ 79° 0.9735 [14] @ 19°		
S-guaiazulene					
		167 to 168 [14] @ 12mm 164 [17] @ 11mm	0.9333 [14] @ 80° 0.9712 [14] @ 23° 0.9728 [14] @ 19° 0.9759 [17] @ 18°		
$C_{20}H_{28}$					
Diterpene					
		194 to 199 [10] @ 17mm 190 to 194 [10] @ 14mm	0.9494 [10] 0.9244 [10]	1.5303 [10] 1.5280 [10]	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-12}					
Dihydroergotetraene-A	98 [18]				$[\alpha]_D^{16} = +121°$ [18]
Ergostatriene-D	134 to 135 [9]				$[\alpha]_D^{23} = +42.7°$ [9]
$C_{29}H_{46}$					
Oleanylene	185 to 186 [24]				$[\alpha]_D^{20} = +96.4°$ [24]
Oleanylene	182 [11]				
Oleanylene I	145 to 149 [23]				$[\alpha]_D^{22} = +78.9°$ [23]
Oleanylene II	186 [23]				
Oleanylene III	178 to 182 [23]				

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-12}					
α-Amyrilene					$[\alpha]_D = +109.48°$ [1]
d-form	135 [21]	450 [22]	0.9532 [16] @ 137.0°	1.5107 [16] @ 137.0°	$[\alpha]_D = +109.5°$ [21]
	134 [16,22]	285 [22] @ 15mm			
	134 to 135 [19]				
	133 to 134 [13]				
l-form					$[\alpha]_D = -104.9°$ [12]
	193 to 194 [20]				
α-Amyrilene I					
	133 to 135 [23]	235 [15] @ 0.1mm	0.9857 [15] @ 38°	1.5420 [15] @ 38°	
α-Amyrilene II					$[\alpha]_D^{19} = +136.6°$ [23]
	119 to 120 [23]				
β-Amyrilene					$[\alpha]_D = +112.19°$ [1]
	175 to 178 [19,21]	235 [15] @ 0.1mm	0.9268 [16] @ 173.2°	1.4973 [16] @ 173.2°	$[\alpha]_D = +111.3°$ [21]
	173 to 175 [16]		0.9807 [15] @ 38°	1.5409 [14] @ 38°	

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-12}					
β-Amyrilene I	170 to 175 [23]				$[\alpha]_D^{19} = +139.3°$ [23]
β-Amyrilene II	147 to 148 [5] 148 to 150 [23]				$[\alpha]_D^{22} = +155°$ [5]
β-Amyrilene III	103 [5]				$[\alpha]_D^{20} = +54.1°$ [6]
γ-Amyrilene	175 [6]				
α-Latucene	207 [4]				
α-Viscene	169 [2]				$[\alpha]_D^{20} = +120.2°$ [2]

Hydrocarbons of Undetermined Structure	*M. P., °C.*	*B. P., °C. @ 760mm*	D_4^{20}	n_D^{20}	*Additional Data*
C_nH_{2n-12}					
β-Viscene	161 [2]				$[\alpha]_D^{20} = +32.2°$ [2]
$C_{31}H_{50}$ **β-Euphorbodiene**		232 to 235 [3] @ 5mm			
C_nH_{2n-18}					
$C_{27}H_{40}$ **Ergotetraene A**	97 [18]				$[\alpha]_D^{16} = +176°$ [18]
Ergotetraene B	105 [18]				$[\alpha]_D = +93°$ [18]
Ergotetraene C	98 [7]				$[\alpha]_D^{20} = +121°$ [7]

Hydrocarbons of Undetermined Structure	M. P., °C.	B. P., °C. @ 760mm	D_4^{20}	n_D^{20}	Additional Data
C_nH_{2n-18}					
Lumistatetraene	88 to 90 [8]				$[\alpha]_D^{24} = +298.9°$ [8]

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